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Poverty And Inequality in Tamil Nadu

by

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POVERTY AND INEQUALITY IN TAMIL NADU

'The very rich are different from you and me'.
'Yes, they have more money'.

(Adapted from Ernest Hemingway's *The Snows of Kilimanjaro*)

INTRODUCTION

The subject under review is a potentially very vast one, and entails an investigation into categories on which there is not a great deal of consensus. Indeed, the subject is a good candidate for being a non-starter if we linger indefinitely on the definitional squabbles -- on *what* is poverty and *what* is inequality -- which have characterized debates on the subject. For our purposes, we shall adopt certain definitions and concepts which, while they are by no means exempt from controversy, have nevertheless elicited a respectable degree of agreement in the *economic* literature on poverty and inequality. For the most part, our concern will be with submitting secondary data to statistical manipulation with the object of presenting some orders of magnitude of the prevalence and intensity of poverty and economic inequality in Tamil Nadu. The dangers of an excessive reliance on "numbers-games" are well-known, and do not need to be reemphasized here; nevertheless, it is useful to identify the limits within which the present exercise is conducted.

This chapter is divided into five sections. Section I provides some necessary background material on various measures of poverty and inequality we shall be using in the chapter, and on the methodology and data-sources employed for the ensuing statistical profiles on poverty and economic inequality in

Tamil Nadu. Section II takes up for examination the magnitudes (and where time-series data are available, trends) of various poverty-related indicators such as per capita real consumer expenditure, the aggregate expenditure gap, the head-count ratio, Sen's index of poverty, nutritional deprivation, and the occupational incidence of poverty. Section III considers the extent of inequality in the distribution of assets, land and consumer expenditure; it also attempts a "real-income" comparison of (rural) Tamil Nadu with other States. In Section IV, the phenomena of deprivation and disparity are studied in more general terms, and a brief discussion of broad "policy"- related issues is presented. Section V offers some concluding observations. The Chapter also carries a Technical Appendix on the measurement and computation of certain indices of poverty and inequality. All figures and major tables have been presented together at the end of the main text.

I. PRELIMINARIES

1. Poverty and Inequality: Concepts[1/]

A Technical Appendix at the end of this chapter provides a summary, mathematical overview of the concepts of poverty and inequality, and their measurement, that are relevant for this chapter. Here we present a brief, non-technical survey of some useful concepts.

(a) The Head-Count Ratio (HCR): The head-count ratio measures the proportion of people in poverty, i.e. the proportion of people whose income is less than a level which is judged to be a "poverty line"[2/]. How is the poverty line itself determined? In a broad way, there are two approaches to the identification of the poverty line -- one of which is in the "absolutist" tradition, and the other in the "relativist" tradition.[3/]

It should be mentioned here that there is considerable confusion on the precise distinction between the two approaches, as pointed out in Sen (1983). Townsend (1979), in resisting the view that poverty should be estimated in terms of a line below which people are judged to be "absolutely impoverished", without regard for the possibilities of need-variations over time and across space, suggests: "Any rigorous conceptualization of the social determination of needs dissolves the idea of 'absolute' need. And a thoroughgoing relativity applies to time as well as place. The necessities of life are not fixed. They are continuously being adapted and augmented as changes take place in society". Although Townsend speaks here of a "thorough-going relativity", his case appears, in the main, to amount to a demand for some flexibility in the "absolute" norm of poverty to take account of temporal and spatial variations in needs.

We shall attempt to give expression to the notions of an "absolute" poverty line and a "flexibly absolute" poverty line in the following way. The "absolute poverty line" we shall use is a consumer expenditure level of Rs.15/- per capita for a period of thirty days at 1960/61 prices for rural Tamil Nadu, and a consumer expenditure level of Rs.20/- per capita for a period of thirty days at 1960/61 prices for urban Tamil Nadu. These poverty lines have -- to borrow a phrase from Ahluwalia (1978,p.7) -- "... an established pedigree in the Indian literature", and we shall not attempt any other, independent rationalisation of the chosen poverty lines. We shall also specify as an "abject" poverty line an expenditure level of Rs.7.50/- per capita for a period of thirty days at 1960/61 prices for rural Tamil Nadu, and an expenditure level of Rs.10/- per capita for a period of thirty days at 1960/61 prices for urban Tamil Nadu.

Townsend's view of the non-fixity of needs over time can be captured by allowing for an upward revision of the "absolute" poverty lines specified above. A simple, if (necessarily) arbitrary procedure we shall adopt is to allow the "absolute" poverty lines to compound at an annual rate of one per cent per annum: a rate of one per cent per annum appears to be a modest estimates of the pace at which "minimum needs" may be expected to increase over time.

While dealing with the notion of "relative" poverty, it is relevant to quote Fiegehen, Lansley and Smith (1977)[4/]: "... 'relative' concepts of poverty (require that) the extent of poverty is judged not by some absolute historically defined standard of living, but in relation to contemporary standards. By such a moving criterion poverty is obviously more likely to persist, since there will obviously be certain sections of society that are badly off in the sense that they receive below-average incomes". For purposes of completeness, we shall also, in this chapter, use a poverty line which is, simply, in any given year the average per capita consumer expenditure in that year. Apart from the problem that with such a "relative" poverty line the proportion of people below it can never be zero, there is also the problem that the head-count ratio would be insensitive to, say, a doubling of each person's income: to infer from this that there has been no change in the poverty-profile of the community is clearly odd. Such a "relative" notion of poverty tends to collapse into "... some imperfect representation of inequality as such"[5/]. Care should be taken to note that meaningful intertemporal comparisons of "relative" poverty tend to be restricted to special situations such as one in which, say, from one year to another the average real per capita consumer expenditure increases and the proportion of people below the (moving) "relative" poverty line declines (or remains constant).

It is useful, at this stage, to summarize the four poverty lines we shall be using in this chapter:

(i) an "absolute" poverty line, given by a consumer expenditure level of Rs.15/- (respectively Rs.20/-) per capita for a period of thirty days at 1960/61 prices for rural (respectively, urban) Tamil Nadu;

(ii) an "abject" absolute poverty line, given by one-half the absolute poverty lines specified in (i) above;

(iii) a "flexibly absolute" poverty line which takes account of the possibility of needs increasing over time, and which is obtained by allowing the absolute poverty lines specified in (i) above to compound at an annual rate of one per cent; and

(iv) a "relative" poverty line, given by the average per capita consumer expenditure level in any year.

Let us now return to a discussion of the head-count ratio as a measure of poverty, in connection with which we have had to dwell on the conceptualisation of the poverty-line. However we may specify the poverty line, a simple count of the number of people below this line surely does not present us with a comprehensive picture of poverty. In particular, the head-count ratio presents us with no notion of the "intensity" of poverty, in the sense that it provides us with no information on how poorly the poor, on average, are faring in relation to the poverty-line. For this, we turn to

(b) The Proportionate Expenditure Gap (PEG): The PEG measures the shortfall in the average per capita consumer expenditure of the poor from the poverty line, expressed as a proportion of the poverty line. Clearly, the greater the hiatus between the poverty line and the average per capita expenditure level of the poor, the greater the 'intensity' of poverty.

Neither HCR nor PEG, taken in isolation, provides a comprehensive picture of poverty: the one, in some sense, is an indicator of the <u>prevalence</u> of poverty and the other of the <u>intensity</u> of poverty. Even when taken <u>together</u>, the two indicators do not exhaust the "information" content of poverty. In particular, some notion of "relative" poverty is missed out: in a straightforward way, the greater the extent of inequality in the distribution of expenditure among the poor (measured, say, by the Gini ratio G^P of inequality among the poor), the worse may we judge the nature of poverty to be -- other things remaining the same. HCR, PEG and G^P taken together furnish us with a more complete picture of poverty than any one of these indicators taken by itself. A comprehensive measure of poverty which takes this into account is one due to Sen:

(c) <u>The Sen Index of Poverty(S)</u>: S[6] is given by

$$S = (HCR) [PEG + (1 - PEG) G^P].$$

S, it may be noted, lies in the interval [0, 1]: the closer it is to 1, the greater the degree of poverty. Various modifications[7] of S are possible, depending, for example, on how we choose to measure inequality in the distribution of expenditure among the poor.

We may note here that if the poverty line is replaced by the average per capita consumer expenditure level and the head-count ratio is allowed to go to unity, then S will simply collapse to the Gini ratio of inequality G for the distribution of consumer expenditure among the entire population. In estimating <u>inequality</u> per se, we shall use only the measure G in this chapter,[8] a measure we take to be sufficiently well-known to not merit any discussion here.

With this preliminary discussion of the concepts of poverty and inequality we shall be dealing with, we take up for brief discussion the methodology employed for the statistical exercises undertaken in this chapter.

2. Methodology: The key to the computation of the various poverty and inequality indices discussed in the previous section resides in the Lorenz Curve. The Lorenz curve, as is well-known, is derived from plotting the cumulative share in expenditure, arranged in ascending order, against the cumulative proportion of population, arranged in ascending order. (See Figure 1). If expenditure is equally distributed among the population, the Lorenz curve will coincide with the diagonal of the unit square; with an unequal distribution, the Lorenz curve will lie below the diagonal. From data on the distribution of consumer expenditure across different expenditure size-classes, one can obtain a set of points which can be connected by straight lines to yield a "broken" approximation of the Lorenz curve. There are obvious advantages to working with a smoothly continous Lorenz curve; Kakwani (1980a) has suggested a new coordinate system for the Lorenz curve: using this coordinate system, the (continuous) Lorenz curve can be estimated by regression. (The technically oriented reader is referred to the appendix at the end of this chapter).

The advantage of working with a smoothly continuous (as opposed to a "linearly broken") Lorenz curve comes into focus when we consider the problem of estimating the head-count ratio (and therefore the Sen Index of poverty). If the poverty line does not coincide precisely with the upper or the lower limit of any expenditure size class, but lies within the class interval, then it becomes problematic to determine the precise proportion of people below the poverty line when the Lorenz curve is a broken one.[9] With a continuous Lorenz curve, however, one can

make use of the property that the derivative of the curve at any point is equal to the ratio of the expenditure level corresponding to that point and the mean of the distribution (of expenditure). If the poverty line is given by a consumer expenditure level of y*, and the average per capita consumer expenditure level is denoted by μ, then the cumulative proportion of people with expenditure levels below y* and the cumulative share in total expenditure of these people can be determined by equating the slope of the Lorenz curve at the point corresponding to y* to the ratio y^*/μ. Further technicalities will not be pursued here. We shall simply note that the head-count ratio, the proportionate expenditure gap, the Gini ratio of inequality in the distribution of consumer expenditure among the poor, the Gini ratio of inequality in the distribution of consumer expenditure among the entire population, the Sen index of poverty -- all of these measures can be relatively easily computed once the equation of the Lorenz curve has been estimated along the lines suggested by Kakwani (1980a). For a more comprehensive understanding of the precise computational techniques involved, the interested reader is referred to the Appendix at the end of the chapter.

Apart from these "technical" aspects of computation, there are other, rather different, kinds of problems involved in the estimation of poverty indices. These have to do with the fact that the data on the distribution of consumer expenditure in any given year are furnished at <u>that</u> year's prices. This would require our converting the poverty lines at constant prices into poverty lines at <u>current</u> prices -- which, in turn, would entail the use of appropriate price deflators. The choice of a suitable price deflator has itself been a source of considerable controversy in the poverty literature.[10/] We shall not here enter into the details of the debate. For our purposes, we shall follow Bardhan (1970) and Ahluwalia (1978)[11/] in using the Consumer Price Index of Agricultural Labourers (CPIAL) as the price

deflator for rural Tamil Nadu[12]; for urban Tamil Nadu, we shall use the Consumer Price Index of Industrial Workers (CPIIW) as the appropriate deflator. Data on the price indices are available in the monthly publication of Indian Labour Journal.[13] The Index numbers of prices in the years for which our study has been done are presented in Tables 1 (a) and 1 (b).

Using these deflators, the four poverty lines discussed in Section 1.2 can be presented at current prices, as in Tables 2 (a) and 2 (b). (Note, however, that poverty line (iv) -- the average per capita consumer expenditure level -- is available directly at current prices from the NSS data on distribution of consumer expenditure).

It should be noted that the price-indices used in the construction of poverty lines at current prices are weighted averages of the price indices of different commodities which enter into the "base-year bundle" of commodities. Clearly, a given increase (or decrease) in the composite price index will affect the fortunes of individuals in different expenditure classes differentially: much would depend upon the precise composition of commodities going into the typical consumption bundles of individuals in different classes, the price changes in these commodities, and the income/substitution effects attendant upon these price changes. Ideally, one should work with fractile-specific prices -- which, unfortunately, constitute a tall order in terms of the data-requirements they impose. We shall not pursue this point further here, save to note that it is a conceptually and empirically important issue in poverty calculations -- but about which, owing to data-constraints-- we cannot do very much.[14]

We shall now turn our attention to the major source of official data employed in this study.

3. Data: The principal source of data we shall be using for obtaining our estimates of poverty (and inequality in the distribution of consumer expenditure) is constituted by information contained in various rounds of the National Sample Survey (NSS) which brings out a publication entitled 'Tables on Consumer Expenditure'. Clearly this is not the only source of data used in this study, but since it is the most important source, we shall in this section confine our remarks to the NSS consumer expenditure data.

As we have seen in Section I.3. the Lorenz curve is the basis for all computations of poverty and inequality indices: the informational requirement for a study of this type collapses essentially to data on two variables, viz., the coordinates of the Lorenz curve. Of vital importance, therefore, are data on (a) the proportion of the population in various consumer expenditure size classes and (b) the average level of consumer expenditure size class. With data on these two variables, one can derive the coördinates of the Lorenz curve; the estimation of various poverty and inequality measures is then a routine exercise which can be performed along the lines described in the Appendix to this chapter.

The coordinates of the Lorenz curve can be derived from the NSS consumer expenditure data which are presented in two important tables separately for rural and urban areas. The first of these tables gives information on the percentage distribution of estimated number of persons by monthly per capita expenditure classes, and the second gives information on consumer expenditure in rupees per person for a period of thirty days by broad groups of items of consumption and by monthly per capita expenditure classes. Upto 1970/71 (NSS 24th Round), thirteen consumer expenditure classes were employed, the class intervals being: Rs.0-8, 8-11, 11-13, 13-15, 15-18, 18-21, 21-24, 24-28, 28-34, 34-43, 43-55, 55-75 and 75 and above. From 1972-73 (NSS 26th Round), fourteen size classes have begun to be used: at the

lower end of the size class spectrum, three size classes, viz., 0-8, 9-11, 11-13 have been excluded while at the upper end, four additional size classes have been included, viz., 75-100, 100-150, 150-200 and 200 and above. In 1977-78 (NSS 32nd Round) the lowest size class is 0-10; in 1983 (NSS 38th Round), the lowest size class is 0-30 and the highest is 300 and above.

The reference period of our analysis covers selected years in the sixties, the seventies and the eighties, and we have had to confine our estimates to those years for which the NSS data, at the level of the State, provide information on both the variables (a) and (b) mentioned earlier. In the light of this requirement, our analysis has been done for eleven years: 1961/62, 1963/64, 1965/66, 1967/68, 1968/69, 1969/70, 1970/71, 1971-72, 1972/73, 1973/74, 1977/78 and 1983.[15/] The latest year for which data are available -- 1983 -- is already three years behind the time of writing of this chapter: our estimates are not up-to-date, but they have been extended as far forward in time as the data will permit. The present study also contains some work on estimates of nutritional poverty and inequality, and for this purpose we have used NSS data, for the year 1972-73, on the distribution of calorific intake across different consumer expenditure size classes.[16/]

A full-scale critique of the NSS consumption data is beyond the scope of this chapter: the interested reader is referred, for a detailed discussion, to Vaidyanathan (1983). For our purposes, we shall confine our remarks to a few salient features of the NSS data which are of particular relevance to the ensuing analysis.

(i) It should be emphasized, as has been done by Murthy (1977, p.92)[17/] that the NSS data are not really suitable for obtaining reliable estimates of frequency distributions from which inequality measures can be confidently computed.

"Since the NSS estimates are based on general purpose design with emphasis on point parameters, the estimates of tails, in which the users are specifically interested, are subject to larger sampling error and hence not amenable to deeper analysis".

Despite this difficulty, it should be recognised that the NSS data on consumer expenditure constitute the only body of information from which inequality indices can be calculated.

(ii) The NSS estimates of average per capita consumer expenditure diverge from the Central Statistical Organisation's (CSO) estimates contained in the National Accounts Statistics. Vaidyanathan (1983, p.8) reports:

"The CSO series [of consumption (aggregate and by commodities)] differs markedly from those of the NSS not only in the aggregate but also in respect of the major component categories of consumption; more importantly the two series show quite disparate trends.... the divergent trends between the two series of per capita total consumption noticed in first half of the sixties has been reversed after 1967/68 when the difference has progressively narrowed. However, while the NSS shows a significant decline of PCE upto 1967/68 and a steep rise thereafter, total PCE in 1973-74 was no higher than in 1960-61. The CSO series on the other hand shows a sustained rising trend over the entire period, the level of PCE in 1973-74 being some 13 per cent higher than in 1960-61".

For a discussion of the nature and possible causes of the divergence between the NSS and the CSO estimates, the interested reader is again referred to Vaidyanathan (1983). For our purposes, it is useful to take note of the existence of such a divergence, and to keep it in mind while analyzing trends in average per capita real consumption over time.

(iii) Since we shall be using NSS data on the distribution of colorific consumption across expenditure size-classes, it is relevant to draw attention to the possibility that inequality estimates based on NSS data are exaggerated. This issue has been

discussed by Vaidyanathan who points to "...'the improbably high levels of food-grain consumption in the top deciles of the population."18/ For an investigation into the possibility of double counting in foodgrain consumption, accompanied by an overestimate of consumption in the upper expenditure size-classes, the reader may consult Vaidyanathan (1983).

(iv) A most important difficulty, which has implications for the spatial and temporal comparability of inequality indices estimated from NSS data, has been discussed by Suryanarayana (1984). The price level in urban areas is generally higher than in rural areas: since the expenditure size class intervals are specified in _nominal_ terms, a relatively larger proportion of the population would tend to be included in the upper expenditure groups in urban areas where the price level is higher, and therefore nominal consumption levels are higher. Inequality ratios calculated from NSS consumer expenditure data would therefore tend to be underestimated in urban areas _vis-a-vis_ rural areas. Much the same kind of difficulty would arise with inter-temporal comparisons of inequality based on NSS data. Secular inflation would raise nominal expenditure levels over time, resulting in a larger and larger proportion of the population being pushed into the upper expenditure classes; this is inevitable, given a relatively infrequent reclassification of expenditure size-classes over time to take account of price-rises. The implification is that over time, inequality would tend to be progressively understated. In fact, Suryanarayana, in the work cited earlier, has estimated the Gini ratio for the distribution of consumer expenditure (all India) for selected years from 1961/62 to 1973/74; his results display a declining trend in inequality; recomputation of the estimates after correcting for the complication discussed above yields an _increasing_ trend in inequality over time. (For details, see Suryanarayana (1984)). In interpreting the results on trends analyzed in this chapter, the reader is cautioned to take note of this aspect of the NSS data,

which renders inter-temporal and spatial comparisons of inequality a tricky exercise.

The preceding has been a far from comprehensive description and critique of the NSS data on consumer expenditure: it has been intended only to serve the limited purpose of introducing the reader to (admittedly, a few of) the pitfalls associated with an unqualified interpretation of data.

With these necessary preliminaries over, we can now turn our attention to some results of our statistical analysis on poverty and inequality in Tamil Nadu.

II A STATISTICAL PROFILE OF POVERTY IN TAMIL NADU

1. Trends in Consumer Expenditure: Table 3(a) presents data on the average per capita consumer expenditure levels in rural and urban Tamil Nadu for the reference period under consideration. Table 3(b) presents data on the median per capita consumer expenditure levels. Expenditure levels, in both tables, are presented in real terms, i.e. at 1960/61 prices. Figures 2(a) and 2(b) plot the trends in the mean and median per capita consumer expenditure levels. Also plotted in the two figures are the rural and urban "absolute" poverty lines at constant prices: the graphs present a visual idea of the distance of the mean/median consumer expenditure from the poverty line.

It can be seen from Tables 3(a) and 3(b) and figures 2(a) and 2(b) that in urban Tamil Nadu, with the exception of the year 1983, the mean and median levels have not, in any year after 1961/62, reached the 1961/62 levels; in the rural areas, the mean exceeds the 1961/62 level only in three years (1973/74, 1977/78 and 1983), while the median exceeds the 1961/62 level only in four years (1972/73, 1973/74, 1977/78 and 1983). At its highest (in 1983), the mean exceeds the poverty line in

urban areas by just over 45 per cent. The median lies below the poverty line in urban Tamil Nadu in five of the eleven years for which we have observations - 1965/66, 1967/68, 1970/71, 1972/73 and 1973/74 -- and in rural Tamil Nadu for four years -- 1965/66, 1967/68, 1968/69 and 1969/70. To sum up: the absolute levels of median and average real per capita consumer expenditure have been low, and there has been no indication of any increasing trend in these low levels over time.

A somewhat more disaggregated picture of the trends in per capita real consumer expenditure becomes available if the population is divided into two groups -- the poor and the nonpoor-- differentiated one from the other by the poverty line. (See Tables 4(a) and 4(b), and figures 3(a) and 3(b)). It is readily discernible from the Tables and the corresponding figures that there has been a virtual stationarity in the average real per capita expenditure levels of both the poor and the nonpoor, in rural areas -- and particularly so after 1970/71. The trends for urban Tamil Nadu are also not remarkable.

2. Trends in the Proportionate Expenditure Gap (PEG):

The PEG (as we have seen in Section I.2) measures the proportionate shortfall, from the poverty line, of the average per capita consumer expenditure of the poor. Table 5 presents data on the PEG for the eleven years constituting our reference period. Figure 4 plots the trends in the PEG for both rural and urban Tamil Nadu. (It should be noted than the poverty lines we have used are the "absolute" poverty lines discussed in Section I.1).

The data reveal that, on average, the consumer expenditure level of the poor has ranged from as little as 67 per cent to just under 75 per cent of the poverty line in rural Tamil Nadu, and from a little under 69 per cent to nearly 73 per cent of the poverty line in urban Tamil Nadu. Given that the poverty lines themselves are little more than "destitution" levels, the figures

on PEG speak for quite low levels of living - judged in terms of consumer expenditure -- in Tamil Nadu. The data also suggest that in seven of the eleven years for which we have computed the PEG, the latter has been higher in urban areas than in rural areas. (A higher PEG, to repeat, reflects a greater "intensity" of poverty). In sofar as the <u>trends</u> in PEG are concerned, a little thought will reveal that these must follow the inverse of the pattern of trends in average real per capita consumer expenditure among the poor. Visual confirmation is available from a comparison of figures 3(a), 3(b) and 4.

3. <u>Trends in the Gini ratio of inequality in the distribution of consumer expenditure among the poor</u>: Table 6 and Figure 5 present information on the trends in G^P, for both rural and urban Tamil Nadu. (The "poor", again, are defined as the section of the population with per capita consumer expenditure levels less than the "absolute" poverty lines discussed earlier).

The Gini ratio for the poor --G^P -- varies from .117 to .154 in rural Tamil Nadu. As in the case of the AEG, G^P in the urban areas exceeds G^P in the rural areas in seven years out of the eleven for which we have observations. The absolute magnitudes of the Gini ratios for the poor are, as we shall see later, less than the magnitudes of the Gini ratios for the entire population: this is to be expected, for given the very low levels of expenditure of the poor, disparities among the poor are likely to be relatively muted. The overall trend in inequality in the distribution of consumer expenditure among the poor is reflected in a more stable series for the urban areas than for the rural areas. Also, while G^P in the rural areas has not exceeded its 1961/62 level in any year thereafter, in the urban areas G^P has exceeded its 1961/62 level in every year -- save 1963/64 -- thereafter.

4. Trends in the Head-Count Ratio (HCR): In Tables 7(a) and 7(b) we present data on the proportion of people below the poverty line, for both rural and urban Tamil Nadu. Table 7(c) presents data for the State as a whole.[19/] The HCRs have been computed for each of the four poverty lines specified in Section I.1. The relevant trends have been plotted in figures 6(a) and 6(b) (but mainly only for the HCR's corresponding to the "absolute" poverty lines). Consider first the head-count ratio corresponding to the "absolute" poverty line of Rs.15/- (respectively Rs.20/-) per capita for 30 days at 1960/61 prices in rural (respectively, urban) Tamil Nadu. In the rural areas, the HCR ranges from a high 39.94 per cent (in 1983) to a very high 55.64 per cent (in 1969/70). In urban Tamil Nadu, the spread is from 45.49 percent (in 1983) to a peak of 58.58 per cent (in 1973/74). The absolute magnitudes of the HCRs in both urban and rural areas are clearly very large: it speaks for acute poverty that such large proportions of the population should live below what are not much more than destitution lines. In five of the eleven years for which we have observations, the rural HCR exceeds the urban HCR: this phenomenon is confined to the years prior to (and including) 1969/70; thereafter (as also in the year 1963/64), the urban HCR exceeds the rural. The trend in the rural HCR is, broadly speaking, an increasing one upto 1969/70, after which it declines; however, in all but four years - 1972/73, 1973/74, 1977/78 and 1983 - the rural HCR remains above its 1961/62 level. In the urban areas, despite a precipitous decline in the HCR from 58.58 per cent in 1973/74 to 41.94 per cent in 1983, the HCR, over the entire period under consideration, falls below its 1961/62 level in only one year (1983). Insofar as Tamil Nadu as a whole is concerned, the proportion of people living in poverty ranges from 40.45 per cent (in 1983) to 53.75 per cent (in 1969/70). There are two distinctly identifiable peaks in the HCR: a peak of 53.18 per cent in 1965/66 and a peak of 53.75 per cent in 1969/70. The HCR has remained, for every year after 1961/62 -- save 1977/78 and 1983 -- above its 1961/62 level.

Consider next the head-count ratio corresponding to the "abject" poverty line of Rs.7.50/- (respectively, Rs.10/-) per capita for 30 days at 1960/61 prices in rural (respectively, urban) Tamil Nadu. In seven of the eleven years for which data are available, the urban HCR exceeds the rural. The range in the rural HCR is from a low of 3.34 per cent (in 1972/73) to a high of 10.19 per cent in 1968/69; 1969/70 has also been a bad year in the rural areas, with the HCR hitting 8.62 per cent. In the urban areas, the HCR has varied from 4.39 per cent (in 1961/62) to just a little under 9 per cent (in 1965/66). Other bad years in urban Tamil Nadu, in which the HCR has exceeded 7 per cent, have been 1967/68, 1968/69, 1970/71 and 1972/73. The HCR has been in excess of 4 per cent in rural Tamil Nadu in ten years out of eleven, and in urban Tamil Nadu in all eleven years. For Tamil Nadu as a whole, again the (weighted average) HCR has exceeded 4 per cent in all eleven years, while in seven years it has exceeded 5 per cent. 1968/69 and 1969/70 have been particularly bad years, with the HCR touching 9.36 per cent and 8.03 per cent. The average, for the eleven year series, is a HCR of 6.17 per cent -- which represents a disquietingly sizeable proportion of the population living in drastically straitened circumstances.

We turn next to the head-count ratios corresponding to the "flexibly" absolute rural and urban poverty lines. The motivation here is to examine how the HCRs behave when allowance is made for the possibility of needs-increases over time; the latter is accomodated by allowing the "absolute" rural and urban poverty lines to increase at a compound rate of one per cent per annum. As is to be expected, the HCRs computed for the "flexibly absolute" poverty lines are higher than the HCRs computed for the absolute poverty lines. What is deserving of note is the considerably upward impact on the HCRs of a modest allowance for needs - increases over time. A clear visual presentation of this is available in figure 6(b) where we have plotted the (weighted average) HCRs for Tamil Nadu as a whole, using both the flexibly

absolute and the absolute poverty lines. The HCRs, adjusted for needs-increases, display a generally rising trend in both rural and urban areas, and for Tamil Nadu as a whole; the trend is particularly steep for urban Tamil Nadu. For six years out of eleven - of which five years are in the post 1969/70 period - the urban HCR has been higher than the rural HCR. Among the worst years for rural Tamil Nadu have been 1969/70, 1968/69 and 1977/78 when the HCRs have touched 62.04 per cent, 59.45 per cent and 58.73 per cent respectively. The three worst years in the urban areas have been 1973/74, 1972/73 and 1977/78 -- with the HCRs rising to 69.62 per cent, 63.15 per cent and 62.15 per cent respectively. Thus the bad years in the urban areas have been worse than the bad years in the rural areas. The trend for Tamil Nadu as a whole is dominated by the proportionately high contribution of rural Tamil Nadu to total population: for the State as a whole, the particularly bad years have been 1969/70 (with a HCR of 60.17 per cent), 1977/78 (with a HCR of 59.50 per cent) and 1970/71 (with a HCR of 58.61 per cent). In a general way, the data clearly demonstrate that once we allow for a definition of poverty that takes account of the desirability of accomodating needs - increases over time, poverty-alleviation measures would have to become progressively more vigorous in order to ensure a "needs-adjusted" standard of living.

Finally, we examine the head-count ratios corresponding to the "relative" rural and urban poverty lines discussed in Section I.1. Here we use a moving poverty line represented, in any year, by the average per capita consumer expenditure level in that year. As was noted in Section I.1, it is not meaningful to make intertemporal comparisons of "relative" poverty except in special cases where a form of "vector dominance" obtains. More specifically, let (μ_1^R , F_1) be a vector with μ_1^R standing for the average real per capita consumer expenditure level and F_1 for the head-count ratio corresponding to a poverty line of μ_1^{R} in year 1. Let the vector (μ_2^R, F_2) be similarly

defined for year 2. Then, we can say that poverty has declined from year 1 to year 2 if and only if: either (i) $\mu_2^R > \mu_1^R$ and $F_2 \leq F_1$ or (ii) $\mu_2^R \geq \mu_1^R$ and $F_2 < F_1$.

In situations in which, e.g., $\mu_2^R > \mu_1^R$ and $F_2 > F_1$, inter-temporal comparisons are not meaningful. In the absence of pair-wise vector dominance, a complete ordering of all the years would not be possible. For Tamil Nadu as a whole, a partial ordering of the years, in terms of relative poverty, is presented in figure 7 in which the originating year of an arrow represents superiority over the terminating year of the arrow; years not connected with arrows are not comparable. All we can say from the partial ordering presented in figure 7 is that there has not been a systematic improvement in relative poverty from year to year; indeed, in terms of "relative poverty", the year 1967/68 is "superior" to the years 1968/69 and 1970/71 -- belying thereby the expectation of improvements in relative poverty over time; similarly, relative poverty has taken a step backward from 1961/62 to 1963/64, as also from 1961/62 to 1969/70 and from 1961/62 to 1973/74. Briefly, there is no evidence of an orderly dimuntion in "relative" poverty over time.

To sum up, our analysis of magnitudes and trends in the HCR, using different poverty lines, cannot be certified as being encouraging.

5. Trends in the Numbers of people in poverty: In addition to the proportion of people in poverty, of interest is the numbers of people in poverty: to obtain a more complete picture of the magnitude of poverty one must have some notion of the absolute numbers of individuals affected by deprivation. Table 8 presents the trends in the numbers of people in poverty, using the four different poverty lines discussed earlier, for urban and rural Tamil Nadu and for the State as a whole. Figures 8(a) and 8(b) plot the trend in the numbers of people in poverty - but mainly

only for the cases of the absolute and the flexibility absolute poverty lines.

Using the "absolute" rural and urban poverty lines, one finds that there is a statistically significant increasing linear trend in the numbers of the poor for Tamil Nadu as a whole and for urban Tamil Nadu, although not for rural Tamil Nadu.[20/] For the last year for which we have data (1983), just a little over twenty million persons were in absolute poverty. The annual compound rate of growth of population for the state, from 1961/62 to 1983, works out to 1.79 per cent, while the corresponding figure for the population in absolute poverty works out to 1.37 per cent. The relevant pair of figures for rural Tamil Nadu is 1.34 per cent and 0.83 per cent respectively, while for urban Tamil Nadu it is 2.84 per cent and 2.60 per cent respectively. In the urban areas, the numbers of the poor seem to be quite comfortably keeping pace with general increases in the population.

Turning next to the numbers of people in "abject" poverty, we note that in 1983 -- the last of the years for which we have observations - the number of persons in acute poverty in Tamil Nadu has been around 2.3 millions. One obtains a graphic picture of the magnitude of the problem when one notes that 2.3 million destitutes in 1982/83 would have accounted for about a third of the population of Madras city.

When we take a count of the poor after allowing for the possibility of needs increasing over time, we find that the numbers of the poor in rural areas, in urban areas and in the State as a whole display a statistically significant rising trend.[21/] By 1983, the numbers in poverty (adjusted for needs-increases) stood at a little more than 28 millions. Allowing for some flexibility in the notion of "absolutely fixed" needs over time causes the growth in the numbers of the poor to far outstrip the growth in the general population. Thus, while the

compound rates of growth in population in rural areas, urban areas and the state as a whole from 1961/62 to 1982/83 have been 1.34 per cent, 2.84 per cent and 1.79 per cent respectively, the corresponding rates of growth of population in ("flexibly absolute") poverty have been 2.43 per cent, 4.17 per cent and 2.95 per cent respectively.

Finally, it can be seen that the numbers of people in "relative" poverty, too, have been growing over time, with the numbers touching a peak of 32.47 millions in the State in 1983. When using the average per capita consumer expenditure level as a poverty line, one has to be guarded in making inter-temporal comparisons (see the discussion in Section II.4); however, a rising trend in the numbers of people in "relative" deprivation in the context of a situation in which average real per capita consumer expenditure levels have not increased over time <u>is</u> disquieting.

Overall, the data on the numbers of people in poverty point to a widespread prevalence of poverty which, if anything, has affected more and more people over time.

6. <u>Trends in the Sen Index of Poverty</u>: In the preceding paragraphs we have discussed the trends in the PEG, G^P and HCR which, it will be recalled from the discussion in Section I.1, constitute the component factors entering into the construction of the Sen index of poverty. The trends in this comprehensive measure of poverty are presented in Table 9 and plotted in figure 9. (The poverty lines employed are the "absolute" ones). There are two distinctly identifiable peaks in the urban Sen indices: a peak of .223 in 1972/73, and a peak of .238 in 1973/74. Other bad years for urban Tamil Nadu, in which the Sen index (S) has exceeded a value of .19, have been 1972/73 (S = .223), 1970/71 (S = .216), 1968/69 (S = .20), 1967/68 (S = .199), and 1969/70 (S = .197). In the urban areas, the Sen index at no time -- save in 1983 --

falls below its 1961/62 level. In only three years out of eleven -- 1961/62, 1968/69 and 1969/70 -- is the urban S less than the rural. The worst years for rural Tamil Nadu have been 1968/69, 1969/70 and 1965/66, when the Sen index has touched values of .234, .227 and .208 respectively. The worst year for the urban areas has been worse than the worst year for the rural areas. The average of the S series for urban Tamil Nadu is higher, at .197, than the average for rural Tamil Nadu, at .179. In the rural areas the trend, broadly, is an increasing one until 1968/69 after which it falls away, while in the urban areas the fall is well-marked only after 1973/74. On the whole, the Sen index series confirms the view occasioned by our analysis of other poverty-related variables, namely that the magnitudes and trends relating to urban poverty have been generally worse than those relating to rural poverty.

7. Sources of Fluctuation in Poverty: It would be of interest to examine to what extent variations in the incidence of poverty in rural areas -- which are predominantly dependent upon agriculture-- are explained by variations in agricultural performance. We shall use as a proxy for agricultural performance the output of food-grains (rice, millets, other cereals and pulses) per head of rural population.[22/] Data on output per head are provided in the Table below for the reference period of our analysis.

OUTPUT OF FOODGRAINS (IN TONNES) PER HEAD OF RURAL POPULATION (1961/62-1977/78)

Year	61/62	63/64	65/66	67/68	68/69	69/70	70/71	72/73	73/74	77/78
Food grains output (in tonnes) per head of rural population	.223	.211	.189	.197	.186	.203	.234	.243	.245	.248

A quick scan of Tables 3-9 along with the Table above will reveal that the worst and best years of agricultural performance correspond, generally, with the "worst" and "best" years of poverty performance. The suggestion of an overall negative relationship between agricultural performance and poverty is confirmed by the values of the coefficients of correlation which we have computed to examine the degree of association between selected poverty-related indicators and agricultural performance: the results are presented in the self-explanatory Table below:

DEGREE OF ASSOCIATION BETWEEN SOME POVERTY-RELATED INDICATORS AND AGRICULTURAL PERFORMANCE IN RURAL TAMIL NADU (1961/62-1977/78)

Poverty related indicator	Product-moment coefficient of correlation between relevant poverty-indicator and foodgrains output per head of rural population*
1. Average real per capita consumer expenditure	+.76 (3.294)
2. Per capita real median expenditure	+.86 (4.694)
3. Aggregate Expenditure Gap	-.79 (3.663)
4. Proportion of people in poverty	-.86 (4.712)
5. Sen Index of Poverty	-.87 (4.970)

*Figures in brackets relate to the computed value of the t-statistic.

The relative rural-urban poverty trend can be sought to be explained in terms of the relative rural-urban price levels. Using an "absolute" poverty line of Rs.20/- per capita for thirty days in urban areas, and one of Rs.15/- per capita for thirty days in rural areas at 1960/61 prices, one obtains, for 1960/61, an implicit "urban-rural exchange rate" given by: 1.33 Urban Rupees = 1 Rural Rupee. Putting it, crudely what 1 Rural Rupee

could fetch of the basic necessities of life in 1960/61, 1.33 Urban Rupees could fetch. Using the CPIIW and CPIAL price indices (See Tables 1(a) and 1(b)), one can obtain a series on the implicit "urban-rural exchange rate" over the reference period of this study. The trend in this "implicit exchange rate" quite closely follows the trend in the ratio of the urban Sen index of poverty to the rural Sen index. The two series are presented in the table below, and the observations are plotted in figure 10.

TRENDS IN THE "IMPLICITY URBAN-RURAL EXCHANGE RATE" AND THE RATIO OF THE URBAN-TO-RURAL SEN INDICES OF POVERTY (1961/62-1983)

Year:	61/62	63/64	65/66	67/68	68/69	69/70	70/71	72/73	73/74	77/78	83
Implicit "urban rural" exchange rate	1.26	1.31	1.31	1.20	1.20	1.20	1.39	1.49	1.62	1.41	1.4[illegible]
Ratio of urban to rural Sen indices of poverty	.88	1.09	1.07	1.04	.86	.86	1.20	1.51	1.63	1.23	1.0[illegible]

One obtains a close positive association between the ratio of the urban-to rural Sen index of poverty and the "implicit urban-rural exchange rate", as reflected in a product-moment correlation coefficient of 0.92.[23/] Such a strong association is not, of course, <u>a priori</u> warranted: it does not <u>have</u> to be the case, for example, that a country with a declining real exchange rate in the international currency market should also manifest a worsening in comparative poverty. What the relationship seems to suggest is that the larger the proportionate increase in the price level, the smaller the proportion of people that are likely to be compensated with corresponding increases in nominal incomes: in a word, certain sections of the population are extrememly vulnerable to inflation.

8. Nutritional Poverty: Malnutrition is the single most important aspect of poverty, and in this section we shall have something to say on nutritional deprivation. As was pointed out in fn.2 of Section I.2, the poverty line can be specified in terms of any variable that we may consider appropriate to our context: of relevance to us here is the identification of a poverty line in terms of some nutritional norm. As with any poverty line, the specification of a nutritional poverty line, too, is fraught with many difficulties and, in particular, the choice of a norm of minimum calorific consumption which is valid for all individuals from all occupational categories is not exempt from some arbitrariness.[24/] Without entering into this controversy -- but while taking note of the need to take a qualified view of any "absolute" nutritional norm -- we shall adopt as our nutritional poverty line a per capita per diem intake of 2400 kilocalories by an average Indian. This is a figure which has been suggested in the context of a recommended standard diet for the average Indian by a Nutrition Expert Group of the Indian Council of Medical Research (ICMR) in 1968. This standard diet -- which translates itself into a daily per capita requirement of 2400 kilocalories -- is presented in the Table below.

Standard Diet for the Average Indian (Recommended by the Nutrition Expert Group, 1968)

Article of Food	Recommended per capita Daily Allowance (g)
Cereals	370
Pulses	70
Milk	180
Meat, Fish and Eggs	35
All Vegetables	235
All Fruits	37
Fats and oils	38
Sugar and Gur	40
Total	1005

To what extent does actual calorific consumption measure up to this norm? From the NSS data -- available for the year 1972-73[25] -- on the distribution of calorific consumption by consumer expenditure size-classes, one can obtain a fairly detailed picture of nutritional poverty and inequality in both rural and urban areas of Tamil Nadu. Such a picture is presented in Table 10.

The figures in Table 10 are self-evidently suggestive, and point to a state of drastic nutritional inadequacy in both the rural and the urban areas. The average per capita calorific consumption in the rural areas -- while it is higher than in the urban areas -- still falls short of the nutritional norm of 2400 kilocalories; the proportionate shortfall, in rural Tamil Nadu, is 27 per cent and as high as 29 per cent in urban Tamil Nadu. In general, the indicators of both poverty and inequality are worse for the urban areas than for the rural. Nearly 90 per cent of the urban population live in nutritional deprivation, while the corresponding figure for the rural areas is nearly 78 per cent. For Tamil Nadu as a whole the weighted average HCR, for 1972/73, works out to a little over 81 per cent -- an exceptionally high figure. Further, a little less than 5½ per cent of the rural population and a little more than 5 per cent of the urban population consume, on average, less than half the nutritional norm of 2400 kilocals per capita per diem; this implies that a sizeable proportion -- accounting for a little over 5 per cent -- of the Tamil Nadu population live in a state of the most acute malnourishment.

With the NSS data on the distribution of consumer expenditure across different size-classes, and given the rural and urban "nutritional HCRs", it is a simple matter to convert the nutritional poverty line into corresponding rural and urban consumer-expenditure poverty lines. More specifically, we can, for the year 1972/73, compute the rural and urban per capita consumer expenditure levels above which absolute nutritional penury can

be avoided. These work out to Rs.46.57 in rural areas, and Rs.83.66 in urban areas -- both at 1972-73 prices. For Tamil Nadu as a whole, at 1972-73 prices, the weighted average per capita consumer expenditure level that would be required in order to stave off nutritional deprivation works out to Rs.57.98. Notice that this is the requirement per capita for 30 days: the annual requirement, then, would be Rs.696 (= 57.98x12). It is interesting to note that the CSO estimate of the average per capita State Income in Tamil Nadu, for 1972/73 was Rs.675 (at current prices).[26/] The implication is quite clear: if income were perfectly equally divided, and if 100 per cent of income were spent only on food, then every person in the State might be expected to be able to just ward off nutritional insufficiency. The point can be made somewhat more graphically; assuming an average household size of four, the monthly household earning that would be needed to just meet the nutritional norm of 2400 kilocals per capita per diem works out, at 1972/73 prices, to Rs.186 for the rural areas and Rs.335 for the urban areas. Using the CPIAL and the CPIIW price-deflators, these requirements translate, at 1983/84 prices, into monthly household earnings of Rs.405 in the rural areas, and Rs.878 in the urban areas. In the light of these figures, the contemporary reader can formulate his own picture of what it takes to keep the wolf from the door. Doubtless these calculations are the product of somewhat crude approximations: nevertheless, they do serve the purpose of presenting significantly revealing orders-of-magnitude.

9. Occupational Incidence of Poverty: In this final brief sub-section on poverty, we address ourselves to the problem of identification of the poor according to occupational categories. Using NSS data on the distribution of households by household monthly per capita expenditure and household-type, and by household monthly per capita expenditure and principal industry, it is possible to generate a profile of the occupational incidence of poverty. The data are available for the year 1977-78. Using

the rural and urban poverty lines discussed earlier, one can obtain a picture of the proportion of households, in different occupational groups, in poverty for both rural and urban areas. (In deriving the head-count ratios presented in Table 12, we have assumed that expenditure is uniformly distributed among the population in the expenditure size-classes within which the poverty lines fall). The high incidence of poverty among agricultural labourers and (presumably, small and marginal) owner-cultivators in the rural areas conforms to *a priori* expectations,[27/] as does the high incidence of poverty among construction and manufacturing workers in the urban areas. The single most important occupation, accounting for the largest proportion of all households in poverty, is agricultural labour in the rural areas; and manufacturing labour in the urban areas: workers, in both agriculture and industry, contribute to the bulk of poverty in Tamil Nadu.

Having analyzed how poor the poor are, how poorly the poor have been faring over time, and who the poor are, we turn now to an examination of economic inequality in Tamil Nadu.

III. A STATISTICAL PROFILE OF ECONOMIC INEQUALITY IN TAMIL NADU

Poverty and inequality are intimately linked -- a proposition which requires no elaboration. Having examined, in some detail, various aspects of poverty in the preceding section we turn our attention now to some aspects of economic inequality in the State. A useful way of studying the problem would be in terms of assessing inequalities in endowments and inequalities in the command over final goods: the more obvious counterparts of the two types of inequalities are inequalities in the distribution of assets and inequalities in the distribution of consumer expenditure -- with the magnitude of the former, to be sure, having a large role to play in determining the magnitude of the latter. When speaking of assets we shall be dealing with

(the money value of) assets in general and also, at a more particular level, with (the extent of) land -- the distribution of which is crucial to the socio-economic features of any agrarian economy. The discussion in this section will be relatively brief, and deliberately so: an extensive analysis of the distribution of assets and of land is already contained in Kurien (1981) on which the following two subsections draw heavily.

1. Inequalities in the Distribution of Assets: Data on the distribution of assets-in rural Tamil Nadu only -- are available for two points in time: 1961/62 and 1971/72. The respective sources of data are the two Reserve Bank of India Surveys: the All-India Rural Debt and Investment Survey, 1961/62 and the All-India Debt and Investment Survey, 1971/72. The two surveys contain data on the distribution of assets -- which include all items having money value such as land, building, livestock, agricultural implements and machinery, non-farm and transport equipment, durable household assets, dues receivable on loans advanced in cash and kind, and all forms of financial assets. The data from the two surveys furnish the picture summarized in Table 12, of the distribution of assets among households according to different asset groups. Table 12 is simply a reproduction of (part of) Table 2.19 in Kurien (1981).

The degree of inequality in the distribution of assets across households can be captured, in summary form, by the Gini Ratio (G) [28/]. The Gini ratios for the two reference years 1961/62 and 1971/72 are, respectively, .7056 and .7148: the absolute magnitudes, for both years, are very large and inequality has worsened in 1971/72 vis-a-vis 1961/62. A (perhaps) more graphic picture of the extent of inequality can be captured by noting that in 1961/62, the poorest (in terms of asset-ownership) 29.5 per cent of the population own just 1.2 per cent of the total value of assets, while the richest 25.9 per cent

of the population own as much as 81.2 per cent of the total value of assets. In 1971/72, the poorest 25.54 per cent of the population own less than 1 per cent of the total value of assets, while the richest 32.27 per cent own a little less than 87 per cent of all assets. These figures speak for extraordinary concentration.

2. Inequalities in the Distribution of Land: In discussing inequalities in the distribution of land-holdings, we shall speak of two types of holdings: Ownership holdings and Operational holdings ('Operational' is defined by the accounting identity: "Operational ≡ Owned + Leased-in - Leased Out".) We take up the two types of holdings in turn. Data on the distribution of holdings -- ownership and operational -- are available in the 16th and the 26th Rounds of the NSS, for the years 1959/60 and 1971/72. Table 13 summarizes some relevant distributional data which have been abstracted from Tables 2.2, 2.3 and 2.4 of Kurien (1981) -- these tables in turn being based on information contained in the National Sample Survey Reports Nos.66, 159 and 215, Vol.I.

Gini ratios can be calculated for the distributions presented in Table 13. The values of G in the distribution of ownership holdings for the two reference years 1959/60 and 1971/72 are, respectively .7537 and .7302. The corresponding values of G in the distributions of operational holdings are .7201 and .7116. These figures speak for very high degrees of concentration in the ownership and operation of land, with hardly any noticeable changes in concentration over time.[29/] Further, such intense concentration is accompanied by very low average levels of extent of land owned/operated: the average acreage of an ownership holding is 2.03 in 1959/60, and 1.83 in 1971/72, while the average acreage of an operational holding is a low 2.15 in 1959/60, which declines to 1.90 in 1971/72.[30/]

From the data analysed in Sections III.1 and III.2, a picture of general poverty and considerable skewness in the distribution of endowments (land and assets) emerges. The asymmetries in the distribution of land would be even more pronounced if one took account of the quality of land and its productivity -- of which the availability of irrigation is an important determinant. For an illuminating case study of inequalities in the distribution of land and other assets in a Tamil Nadu village, the interested reader is referred to Ramachandran (1983).

3. Inequalities in the Distribution of Consumer Expenditure:

Table 14 furnishes our estimates of the Gini ratio of inequality in the distribution of consumer expenditure among the entire population for the reference period of this study. The observations are plotted in the relevant graph of figure 11.

As we have noted earlier, the Gini ratios for the entire population (G) are consistently higher than the Gini ratios for only the poor (G^P). Further, the Gini ratios in the urban areas are systematically higher than in the rural areas: as in the case of poverty, inequality too would appear to be more severely pronounced in urban Tamil Nadu than in rural Tamil Nadu. The two worst years in rural areas have been 1977/78 and 1983, while the worst year for urban Tamil Nadu has been 1967/68. It is interesting to note that the third best year in urban Tamil Nadu (1968/69) betrays a Gini ratio (of .334) which is higher than the Gini ratio (of .329) in the worst year (1983) in rural Tamil Nadu. The absence of any systematic declining trends -- in either the rural or the urban areas—in disparities in the distribution of consumer expenditure is particularly disquieting in the context of a data-base which has a built-in bias in favour of understanding inequality over time (see the discussion in section I.3).

The extent of inequality in the distribution of consumer expenditure can also be evaluated by comparing the average levels of expenditure of the poorest and the richest deciles, and the shares in total consumer expenditure of the poorest and the richest deciles. This has been done, for both the rural and the urban areas, for the year 1983 -- which is the most recent year for which we have data. The results of the exercise are summarized in the Table below:

DISPARITIES IN CONSUMER EXPENDITURE OF THE RICHEST AND POOREST DECILES (1983)

	Rural Tamil Nadu		Urban Tamil Nadu	
	Poorest Decile	Richest Decile	Poorest Decile	Richest Decile
Share in consumer expenditure (per cent)	3.43	26.61	3.25	29.16
Average per capita consumer expenditure (Rs)	38.49	298.64	53.22	477.47

As the Table shows, the poorest decile accounts for less than 4 per cent of the total expenditure, and the richest decile for between 26 and 29 per cent. The average per capita expenditure of the poorest decile in rural areas is Rs.38.49 (at current prices), which is just about one-half of the poverty line, while the average per capita expenditure of the richest decile is Rs.298.64, which is just a little under eight times the average of the poorest decile. The disparity in urban Tamil Nadu is even wider: the poorest decile spend, on average, Rs.53.20 per capita (which is just a little less than one-half of the urban poverty line), while the average per capita consumer expenditure of the richest decile is around Rs.477, or a little under nine times that of the poorest decile.

4. Welfare Comparisons: In Section II and in the present Section we have analyzed various aspects of poverty and inequality in Tamil Nadu, without anywhere attempting to locate Tamil Nadu's relative "welfare" position among the other States of the Indian Union. This we attempt to do, after a fashion, in this final subsection of Section III. For the purposes on hand we employ a procedure for "real income comparisons" advanced by Sen (1976b). The novelty of Sen's approach to "real income comparisons" consists in directly and explicitly incorporating distributional considerations in welfare comparisons. This marks a departure from the standard practice of identifying welfare exclusively with per capita "real" GNP (i.e. GNP adjusted for price differences), with no weightage attached to the degree of inequality in the distribution of the GNP. In a technically complex paper, Sen (1976b) provides a set of axiomatic rationalizations for the use of a comprehensive index of welfare given by $\mu(1-G)$, where μ is the average per capita GNP and G is the Gini ratio of inequality in the distribution of the GNP. He outlines a procedure whereby we can compare the values of $\mu(1-G)$ for each State at each other State's prices with a view to making "interpersonal comparisons" of the type: "State x has a higher (lower) level of welfare than it would have if placed in the position of State y". Through a series of pairwise comparisons of this nature, one can (if one is fortunate) obtain a complete welfare ordering of all the States.

Since we do not have data on the distribution of income, we shall work with consumer expenditure: μ and G will relate, respectively, to the average per capita consumer expenditure and the Gini coefficient of inequality in the distribution of consumer expenditure. For the ensuing analysis, we would also require data on State-specific prices. These are available from Ahluwalia's (1978) State-level study of rural poverty in India. Using, then, the set of State-specific prices provided by Ahluwalia, his estimates of the Gini ratio of inequality in the

distribution of consumer expenditure, and the NSS data on per capita consumer expenditure for each State, we have attempted, for the year 1973/74, to obtain a ranking of the Indian States according to the welfare index $\mu(1-G)$. The exercise has been done only for the rural areas, and is identical to one performed by Sen (1976b) for the year 1961/62. The results are presented in Table 15.

Table 15 is to be interpreted as follows. Take any State at random, say, Gujarat. The value of the diagonal element is 41.41. In the Gujarat row, the value of the diagonal element is greater than the values of the elements in the Andhra Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and West Bengal columns (which are, respectively 38.44, 40.57, 39.28, 39.51, 34.60, 35.21 and 30.86). From this we infer that given the prices confronted by Gujarat, Gujarat would "much rather be itself than in the positions of the States of Andhra Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and West Bengal." Proceeding to effect "interpersonal" welfare comparisons of this nature for each State, we can generate the self-explanatory Table below.

Comparative Picture of Rural Welfare Among the Indian States (1973/74)

S.No.	Reference State	Has a higher standard of rural welfare than it would have if placed in the position of the rural community of the following States
1.	Andhra Pradesh	Orissa, Tamil Nadu, West Bengal.
2.	Assam	Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal.
3.	Bihar	Andhra Pradesh, Assam, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal.
4.	Gujarat	Andhra Pradesh, Kerala, Karnataka, Maharashtra, Orissa, Tamil Nadu, West Bengal.

(1)	(2)	(3)
5.	Karnataka	Andhra Pradesh, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal.
6.	Kerala	Andhra Pradesh, Orissa, Tamil Nadu, West Bengal.
7.	Madhya Pradesh	Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal.
8.	Maharashtra	Andhra Pradesh, Kerala, Orissa, Tamil Nadu, West Bengal.
9.	Orissa	West Bengal
10.	Punjab & Haryana	All States
11.	Rajasthan	Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal.
12.	Tamil Nadu	Orissa, West Bengal
13.	Uttar Pradesh	All States excepting Punjab & Haryana and Rajasthan
14.	West Bengal	None

From the Table above we can derive a complete welfare ordering of (the rural areas of) all the States in the Union; the ranking, in descending order, is presented below:

Ranking (in Descending Order) of the States of India According to Standard of Rural Welfare (1973/74)

Punjab & Haryana
Rajasthan
Uttar Pradesh
Madhya Pradesh
Bihar
Assam
Gujarat
Karnataka
Maharashtra
Kerala
Andhra Pradesh
Tamil Nadu
Orissa
West Bengal

The ordering presented above reveals that Tamil Nadu ranks only eleventh out of the fourteen States, with a standard of rural welfare higher only than that of Orissa and of West Bengal.[31/]

IV DEPRIVATION AND DISPARITY: SOME GENERAL ISSUES

Hitherto we have studied the phenomena of poverty and inequality in relation to the categories of consumer expenditure, nutritional intake and income-earning assets. The picture of deprivation and disparity that emerges from the foregoing analysis is one that extends -- unsurprisingly -- to other categories as well. These issues are taken up in detail in the relevant chapters, but we may note here that shortages and insufficiencies of -- and curtailed access to -- housing, health-care, literacy and employment are quite intense and widespread.

Nagaraj and Rukmani (Chapter of this volume) estimate from Census data that if each household were to have a pure, pucca dwelling not older than sixty years, then the degree of shortage in the availability of housing would have been of the order of nearly 62 per cent for Tamil Nadu as a whole in 1971, with the shortage in the rural and the urban areas being, respectively, 69 per cent and 44 per cent. In the urban areas the emergence and proliferation of slums is the most visible manifestation of the tremendous pressures on the demand for housing: according to the estimates of Nagaraj and Rukmani, in Madras city in 1971, slums accounted for nearly 30 per cent of the population but only for 6 per cent of the area.

Given the serious shortfalls in the basic necessities of food (see Section II.3) and shelter, it is not surprising that health indicators should display a dispiriting picture too. Guhan (1983; see also Chapter of this volume) cites Census figures and estimates obtained by Morris and McAlpin (1982) on, respectively, life-expectancy and infant mortality rates for the

various States of the Indian Union: in 1981, the life-expectancy in Tamil Nadu was 54.6 years, and Tamil Nadu ranked only seventh out of twelve States for which data were available; with an infant mortality rate of 114 per 1000 live births, Tamil Nadu ranked sixth among the (twelve) States (for which information was available). The tremendous constraints on the access to health are brought out by statistics relating to the population-bed ratio and the population-doctor ratio. For the late 1970s, the population-bed ratio was in the region of 760 for Madras city, and a staggering 6900 for the rural areas; the population-doctor ratio was about 620 for Madras city, and 4840 in the districts. (For details, See Guhan (1981)).

These overall features of absolute deprivation seek reflection also in another important dimension of social development -- literacy. From Census data, Ramakrishnan (See Chapter   of this volume) concludes that in 1981 only 526 persons out of 1000 in Tamil Nadu were literate. Disparities in literacy-attainment among different groups of individuals are pronouncedly evident from the Census data for 1971 presented by Ramakrishnan: the number of literate individuals per one thousand (of the relevant population) was 454 for all persons; 370 for rural persons; 309 for females; 219 for rural females; 218 for Schedule caste persons; 113 for Scheduled Caste females; 90 for Scheduled Tribes persons; and just 45 for Scheduled Tribes females. Beginning with an overall picture of absolute inadequacy, it worsens very swiftly when we take account of caste-and sex-based disparities.

Access to employment is surely an important factor underlying the various dimensions of deprivation we have discussed. For a useful summary of the unemployment situation in Tamil Nadu, and related issues, the reader is referred to Guhan (1983). He observes that, from data pertaining to 1972/73 in the 27th Round of the NSS, the Draft Five Year Plan 1978/83 presents estimates of unemployment in equivalent person-years for each

of the Indian States. By this reckoning, Tamil Nadu has the largest numbers of unemployed; with 2.35 million person years of unemployment, it accounts for nearly 13 per cent of the unemployment in the country. Among the employed, agricultural labourers and industrial workers are, as we have seen in Section II.9, among the most impoverished occupational categories. Work done by Kurien (1981) suggests that by and large there has, if anything, been an overall decline in the real wage rate for agricultural wage workers in Tamil Nadu. Insofar as industrial workers are concerned, data from the publication Tamil Nadu: An Economic Appraisal suggest that the proportion of wages in total emoluments (wages plus salaries) for the registered manufacturing sector has declined from 78.75 per cent in 1962 to 58.18 per cent in 1978/79. Briefly, the entitlements of those in the poorest occupational groups are mediated in a significant manner by the market: a rise in the price of wage goods relative to nominal wages makes for an overall reduced access to final goods by those sections of the community that are most prone to poverty -- the workers in agriculture and industry.

The very fact of such widespread deprivation and disparity, and their persistence over time in many aspects of economic and social life must serve as a prima facie pointer to the failure of useful policy intervention in the matter. This is not to suggest a state of complete and comprehensive stagnation in various indices of development and welfare; but it is to suggest -- despite secular improvements in the status of health, literacy and other indicators -- that the overall progress on the front of poverty and inequality - reduction has been scarcely encouraging. This is so despite the implementation of various programmes devised explicitly for combating poverty and inequality.

Two specific programmes which are worth mentioning are the Integrated Rural Development Programme (IRDP) and the

Food for Work Programme (FWP). The working of these programmes has been evaluated by the Madras Institute of Development Studies, (MIDS,1980) in two districts of Tamil Nadu -- Ramanathapuram and Dharmapuri. It would be useful to very quickly summarize some of the findings of the MIDS study. (Owing to space constraints, our remarks will be confined largely to the IRDP programme). In principle, the IRDP and the FWP are intended to make a concerted attack on poverty through the provision of assets, incomes and work for the poorest sections of the rural population. The MIDS study suggests that in practice the IRDP suffers from several problems of implementation, including (i) insufficient allocation of funds that would be required to effect a meaningful coverage of the programme; (ii) a tendency of small and medium farmers to benefit relatively more from the provision of subsidies than agricultural labourers who are among the most poverty prone occupational groups; (iii) a general restriction of the operation of the programme to roadside villages which makes for inadequate penetration into disadvantaged villages in the interior; (iv) a substantial breaching of the guidelines defining the target-group of the programme, with a consequential misdirection of limited programme resources to benefit individuals who are not small/medium farmers nor agricultural labourers; (v) a misclassification of small farmers as medium farmers; (vi) a prevalence of negligence, administrative inefficiency and corruption which facilitate the misidentification of potential beneficiaries; (vii) a considerable divergence between the Programme's Credit Plan and the actual lending pattern implemented; and (viii) prohibitively large private costs (including legal, processing and travel costs, and the costs of bribing) needed to secure programme benefits -- to an extent where many of the beneficiaries have ended up in a worse state of indebtedness than before they became targets of the programme's attentions.

The two programmes mentioned above are only two of several schemes aimed, in a broad way, at shoring up the "entitlements"

of particularly vulnerable sections of society. In a review of social security measures that are available in Tamil Nadu, Guhan (1980) discusses various schemes designed to provide relief in cases of unemployment, old age, survivor insurance, sickness and disability. His overall evaluation is again discouraging (Guhan (1980,p.46): 'The broad picture that emerges is that the schemes that exist are of limited coverage, uneven inter se among different contingencies and not particularly directed to the poorest. Together, they do not reflect any deliberate policy in this field. Outside of the organized sector, social security measures have been patchy and piecemeal". A recent social security measure that must be greatly welcomed is the Tamil Nadu Government's Mid-Day Meals Scheme for children; any proper appraisal of the scheme must await a detailed study.

Asset-redistribution -- the shoring up of endowments and not just entitlements -- is an important policy measure that has received considerable attention in policy discussions, particularly in the context of reforms aimed at the redistribution of land. Guhan (1980) estimates, on the basis of data from the 26th Round of the NSS, that the total area of holdings equalling or exceeding 30 acres in Tamil Nadu in 1971/72 was a little over 12 lakh acres; under the existing land-ceiling acts, only a little over a lakh acres had been notified as surplus, of which a little less than 90,000 acreas had been distributed. The performance scarcely seems to suggest an appreciation of the importance of asset-redistribution as a social-security measure.

A more carefully worked-out and consistent plan for the provision of social security -- with particular attention paid to the prioritization of target groups -- should at least pave the way for the eradication of the shameful phenomenon of "abject" poverty we have had occasion to discuss in Section II. As a bottom-line, and surely in the third decade of planned development, it is time for the State to address itself to a

systematic eradication of a situation in which large numbers of people have to live in circumstances that provide them with less than one-half of the extremely modest official poverty-lines of consumer expenditure, or the nutritional norm of calorific intake. Thereafter, a concerted effort of coherent planning and honest implementation of various policies aimed at strenghtening the endowments and entitlements of the vulnerable sections of society should go a long way in relieving the widespread prevalence of deprivation and disparity. As we have seen in this section, it is not as if blueprints do not exist: but presumably, blue-prints are meant for translation into meaningful results. If our evaluation of policy conception and implementation has been negative it is not for reasons of such comfort as can be derived from nihilism but to make the point, one more time, that poverty and inequality can and must be significantly reduced. As with many "policy-oriented" discussions, this one too has been characterised by negative comment on performance and pious exhortations for improvements. If it is painful to deal in chiches, it is even more painful that those responsible for making and implementing policies should repeatedly impose the obligation on commentators to deal in cliches. Evidence for the latter proposition has been the content of the statistical exercises undertaken in this chapter.

V. POVERTY AND INEQUALITY IN TAMIL NADU: A SUMMING UP

We shall now wind up this chapter by gathering together the various findings on poverty and inequality that are a product of the statistical exercises undertaken in the preceding sections. The findings are summarized in the following series of points.

*The absolute levels of average real per capita consumer expenditure, as well as of the median real per capita consumer expenditure, have been low in both rural and urban areas, and these levels have shown no trend of increase over time.

*The shortfall of the average expenditure of the poor from the poverty lines in both rural and urban areas has been generally high: the average shortfall, for our eleven-year series of observations, has been 28.2 per cent in the rural areas, and 29.7 per cent in the urban areas.

*The degree of inequality in the distribution of consumer expenditure among the poor, as measured by the Gini ratio of concentration (G^P) has displayed a more stable behaviour over time in the urban areas than in the rural areas. Inequality has been generally worse in the urban areas than in the rural; while G^P has not exceded its 1961/62 level in any year thereafter in rural Tamil Nadu, it has fallen below its 1961/62 level in only one year thereafter in urban Tamil Nadu.

*The head-count ratio (HCR), which measures the proportion of people in poverty, has been consistently high in both the rural and the urban areas. Using the "absolute" rural and urban poverty lines discussed in Section I.1, the average HCR for our eleven year series works out to 47.15 per cent in rural Tamil Nadu, 49.89 per cent in urban Tamil Nadu, and 47.98 per cent for the State as a whole. Again, one perceives no heartening trend of a decline in the HCR over time.

*When it comes to "abject" poverty, there is no clearly disernnible trend, in either the rural or the urban areas, in the proportion of people in such poverty. For Tamil Nadu as a whole, the average HCR for the eleven year series works out to a little over 6 per cent -- which is surely a disturbingly significant proportion of the population in a state of the most acute destitution.

*When we make allowance for the possibility of needs increasing (at a modest pace) over time, we find that the proportion of people in poverty shoots up considerably. For

Tamil Nadu as a whole, the average HCR for the time-series over our reference period of 1961/62 -- 1983 works out to a high 55.6 per cent - which is 7.6 percentage points in excess of the average HCR computed without allowing for needs-increases over time. The implication is fairly clear: when we relax the conservatism with which poverty is officially defined even marginally, the magnitude of the poverty problem becomes disproportionately large -- and larger with time.

*We have also attempted to reckon the magnitude and trend of "relative" poverty by specifying as the poverty line in any year the average per capita consumer expenditure level in that year. On average, for the eleven-year series that we have, the HCR works out to a staggering 64.09 per cent. Intertemporal comparisons of "relative" poverty are not always meaningful: to the extent that these have been possible, they have been effected, but they betray no evidence of an orderly, systematic dimunition in the proportion of people in "relative" poverty over time.

*Trends in the <u>numbers</u> of people in poverty have also, by and large, been extremely discouraging. The numbers of people in "absolute" poverty have been very comfortably keeping pace with the general rate of growth of population in the State; and when allowance is made for needs-increases over time, the rate of growth of persons in poverty far exceeds the general rate of growth of population.

*The Sen index of poverty -- which is a comprehensive measure of poverty -- fails to betray any trend of decline over time, in either the rural or the urban areas.

*The various indicators of rural poverty appear to be fairly closely correlated with agricultural performance, measured in terms of output of foodgrains per head of rural population. The <u>relative</u> rural-urban poverty pattern betrays

a close relationship to the relative rural-urban price levels ratio, and this is suggestive of the extreme vulnerability of certain sections of the population to the phenomenon of inflation.

*The findings on nutritional deprivation are disquieting. Over 80 per cent of the population is found to be in a state of nutritional inadequacy in relation to a norm of 2400 kilocalories per capita per diem, for the year 1972/73. Over 5 per cent of the population, in the same year, must be deemed to have been in a state of severe calorific deprivation. At (roughly) contemporary prices, the average household earning that would be required to ward off nutritional insufficiency would be of the order of Rs.405/- per month in the rural areas, and Rs.880/- per month in the urban areas.

*In an analysis of the occupational incidence of poverty, we find -- as we might expect -- that industrial and agricultural workers are the occupational groups most prone to deprivation.

*Inequality levels are high in the distribution of assets and of land. From the end of the fifties (or beginning of the sixties) to the beginning of the seventies, Gini concentration ratios for the distribution of assets and of land have remained largely stationary in the range of 0.70 to 0.75. These figures speak for extraordinarily high levels of concentration in the distribution of income-earning endowments. They also seek reflection in the high rates of concentration in the distribution of entitlements to final goods, i.e. in the distribution of consumer expenditure. In 1983 -- the last year for which we have information -- we find that the average per capita consumer expenditure of the richest decile in the rural (respectively, urban) areas exceeds that of the poorest decile in the rural (respectively, urban) areas by a factor of eight (respectively nine).

*A point which is worth making is that the various indicators of poverty and inequality have been generally more pronouncedly severe in the urban than in the rural areas. This should give pause for thought to those who tend to believe that poverty and disparities in living standards are uniquely -- or at any rate predominantly -- rural phenomena.

*In an exercise aimed at comparing rural welfare in Tamil Nadu with that in other States -- and this exercise entails the explicit incorporation or <u>distributional</u> judgements in the evaluation of social welfare -- one finds that Tamil Nadu (for the year 1973/74) fares very poorly in relation to other States, by finishing eleventh in a field of fourteen.

*The phenomena of deprivation and disparity seem to be generalized ones, and carry over to the categories of housing, health care, literacy and employment.

*Government policy intervention in the matter of safeguarding the entitlements and enhancing the endowments of the impoverished sections of society appears not to have made any appreciable dent in the secular trends of poverty and inequality in the State.

The processional meaning of the preceding set of findings distils itself into an uncomplicated message: Tamil Nadu's track record in the fields of poverty and inequality has been a sorry one; and one which -- with coherent policy formulation and principled implementation -- need not and should not be allowed to extend indefinitely into the future.

TECHNICAL APPENDIX

This appendix is intended to serve the purpose of providing a compact, mathematical summary of the poverty and inequality measures used in the chapter, and to outline the computational procedures that have been employed to quantify these measures. The Appendix is not required reading for the general reader, and it has been written mainly for purposes of completeness. It is hoped, of course, that the Appendix will also serve the purpose of ushering the student with a quantitative bent of mind into some of the technical issues involved in the conceptualization and measurement of poverty and inequality indices. Of necessity, this addendum to the chapter is somewhat terse in its treatment of the subject, and the interested reader is referred, for a comprehensive analysis, to Kakwani (1980a).

Y is a continuous random variate designating income. (The reader is at liberty to read 'consumer expenditure' or 'nutritional intake', etc., in place of 'income'.). We define the following:

$$F(y) = \int_0^y f(Y)\,dY; \text{ and}$$

$$F_1(y) = \frac{1}{\mu}\int_0^y Y f(Y)\,dY. \qquad \ldots\ldots \text{(A 0)}$$

$f(\cdot)$ is the probability density function, $F(\cdot)$ the cumulative density function and $F_1(\cdot)$ the first moment distribution

function of the random variate. μ is the mean of the distribution of Y. It should be noted that

$$\lim_{y \to 0} F(y) = \lim_{y \to 0} F_1(y) = 0 \text{ and } \lim_{y \to \infty} F(y) = \lim_{y \to \infty} F_1(y) = 1.$$

Given this, we present in Section I below a quantification of some measures of inequality and poverty in the form of precise mathematical expressions for these; in Section II we outline procedures whereby the expressions in Section I can be computed.

I. QUANTIFICATION

(A) Measures of Inequality:(1) The Gini Ratio (G): In deriving the Gini coefficient of inequality we specify the diagonal of the unit square whose (the diagonal's) equation is $F_1(y)=F(y)$, as the line of perfect equality. Any point on the Lorenz curve is represented by the coordinates $(F(y), F_1(y))$. Figure A.1 (at the end of this Appendix) represents the Lorenz curve. In figure A.1, let A represent the area enclosed by the line of perfect equality and the line showing an unequal distribution, and B the area under the latter. In terms of the areas A and B, the Gini ratio G can be written as:

$$G = A/(A+B) = ((A+B)-B)/(A+B). \qquad \text{...(A 1)}$$

The area (A+B) is simply the area under the curve of perfect equality and is obtained by evaluating the integral $\int_0^\infty F(y)f(y)dy$ -- which is simply 1/2. The area B is obtaned by evaluating the integral $\int_0^\infty F_1(y)f(y)dy$ so that, given (A 1), one obtains:

$$G = 1-2 \int_0^\infty F_1(y)f(y)dy. \qquad \text{...(A 2)}$$

(2) The Gini Ratio of Inequality in the Distribution of Income among the poor (G^p).

Let y* represent the poverty line. Then the set of all individuals with incomes less than or equal to y* will be said to constitute the poor. Letting F^p and F_1^p stand for the cumulative density and the first moment distribution functions respectively in the distribution of income among the poor, one has $F^p \equiv F/F(y^*)$ and $F_1^p \equiv F_1/F_1(y^*)$ so that, analogously to (A 2), one obtains

$$G^p = 1-2 \int_0^\infty F_1^p(y)F^{p'}(y)dy = 1 - 2 \int_0^{y^*} \frac{F_1(y)f(y)dy}{F(y^*)F_1(y^*)} \qquad \text{...(A 3)}$$

B. Measures of Poverty

1. The Head Count Ratio (HCR)

The HCR is simply the value of F(y) at y = y*:

$$HCR = F(y^*). \qquad \text{...(A 4)}$$

The value of $F_1(y)$ at $y = y*$ $(F_1(y*))$ is the cumulative share in income of the poor. It is clear that the average income of the poor, μ^*, is given by

$$\mu^* = \frac{F_1(y*)}{F(y*)} \mu. \qquad \text{....(A5)}$$

The proportionate Income Gap (PIG)

The PIG -- measured as the proportionate shortfall of the average income of the poor from the poverty line -- will be given by PIG = $(y* - \mu*)/y*$ which, in view of (A5), can be written as

$$\text{PIG} = 1 - \frac{F_1(y*)}{F(y*)} \cdot \frac{\mu}{y*} . \qquad \text{....(A6)}$$

3. The Sen Index of Poverty (S)

S, as we have seen in Section I.1, is given by : $S = \text{HCR}.(\text{PIG} + (1 - \text{PIG})G^P)$. Substituting for HCR, PIG and G^P from (A4), (A6) and (A3) respectively, one obtains:

$$S = F(y*)((1- \frac{F_1(y*)}{F(y*)} \cdot \frac{\mu}{y*})+(\frac{F_1(y*)}{F(y*)} \cdot \frac{\mu}{y*})(1-2 \int_0^{y*} \frac{F_1(y)f(y)dy}{F(y*)F_1(y*)})). \qquad \text{....(A7)}$$

II. COMPUTATION

As we have seen in Section I.2, the essential methodological component of our computational procedures resides in estimating the equation of the Lorenz curve. We begin by recalling that the Lorenz curve is simply the functional

relation between $F(y)$ and $F_1(y)$, and is obtained, in the standard unit square diagram, by plotting points with the coordinates (F, F_1). Kakwani (1980a) has suggested a new coordinate system for the Lorenz curve: the relationship between F_1 and F can also be captu ed by the relationship $\eta = g(\pi)$, where η and π are defined as:

$$\eta = \frac{1}{\sqrt{2}}(F - F_1); \text{ and} \quad \ldots(A8)$$

$$\pi = \frac{1}{\sqrt{2}}(F + F_1). \quad \ldots(A9)$$

(It may be noted that π is the perpendicular distance from the diagonal of the unit square in which the Lorenz curve is drawn to any point on the Lorenz curve, and η the distance from the origin, along the diagonal, to the point from which the perpendicular is drawn. (See Figure A1). Hence π will vary from 0 to $\sqrt{2}$, and at the two extreme values of π, η will be 0). A specific functional form of g which has been noted to yield good estimation results is given by

$$g(\pi) = a\pi^{\alpha}(\sqrt{2} - \pi)^{\beta}, \; a, \alpha, \beta, > 0. \quad \ldots(A10)$$

Now whenever distributional data -- as in the case of the NSS consumer expenditure data -- are available in the form of a set of points in (F, F_1) space, we can use the transformations presented in (A8) and (A9) to obtain a set of coordinates in (π, η) space; using (A 10), the equation of the underlying curve can be estimated by performing an Ordinary Least Squares (OLS) multiple regression of η on π and $(\sqrt{2} - \pi)$ in log-linear form:

$$\ln \eta = \ln a + \alpha \ln \pi + \beta \ln(\sqrt{2} - \pi) + \varepsilon_i, \qquad \ldots (A\ 11)$$

where ε_i is a stochastic error term satisfying the usual 'normality' properties. (A 11) is the basic estimating equation; and once a, α, and β have been estimated, the stage is set for a routine computation of the various inequality and poverty measures. Table A1 below presents our estimates of a, α, and β for the distribution of consumer expenditure over the reference period 1961/62 - 1983/84; the data base, of course, is the NSS consumer-expenditure one.

Table A1: OLS Estimates of a, α and β in the Distribution of Consumer Expenditure in Rural and Urban Tamil Nadu 1961/62 - 1983)

Year	Rural Tamil Nadu			Urban Tamil Nadu		
	OLS Estimates of			OLS Estimates of		
	a	α	β	a	α	β
1961/62	.2748	.8328	.7812	.2956	.8750	.7076
1963/64	.2726	.8693	.7748	.2963	.8925	.7007
1965/66	.2692	.8964	.8140	.3161	.9200	.8235
1967/68	.2517	.8812	.8194	.3110	.8745	.6578
1968/69	.2913	.8954	.8573	.3046	.8968	.7978
1969/70	.2757	.8831	.7834	.3003	.8843	.7516
1970/71	.2354	.8564	.7962	.3078	.9089	.7526
1972/73	.2545	.8833	.8305	.2904	.9119	.7948
1973/74	.2779	.9329	.9451	.2844	.9255	.7928
1977/78	.2696	.8355	.6997	.3001	.8827	.7601
1983	.2902	.8604	.7636	.3112	.8773	.7354

Before proceeding further it is useful to note, from (A8) and (A9), that

$$F = \frac{1}{\sqrt{2}}(\pi + g(\pi)) \qquad \text{...(A 12)}$$

and $F_1 = \frac{1}{\sqrt{2}}(\pi - g(\pi))$. ...(A 13)

Further,

$$f(y)\ (\equiv F'(y)) = \frac{d}{dy}\left(\frac{1}{\sqrt{2}}(\pi(y)+g(\pi(y))\right) = (1 + g'(\pi))\frac{d\pi}{dy}. \qquad \text{...(A 14)}$$

Consider now the expression (A2) for the Gini ratio of inequality; using (A 12), (A 13) and (A 14), (A2) can also be written as:

$$G = 1-2\int_0^{\sqrt{2}}\left(\frac{1}{\sqrt{2}}(\pi-g(\pi))\right)(1+g'(\pi))\,d\pi. \qquad \text{...(A 15)}$$

It is a routine matter to check that (A 15) simplifies to

$$G = 2\int_0^{\sqrt{2}} g(\pi)\,d\pi. \qquad \text{...(A 16)}$$

Substituting for $g(\pi)$ from (A 10) into (A 16) yields $G = 2\int_0^{\sqrt{2}} a\pi^{\alpha}(\sqrt{2}-\pi)^{\beta}\,d\pi$ which, it can be verified, one may write as:

$$G = 2a(\sqrt{2})^{\alpha+\beta+1}.B(1+\alpha,1+\beta) \qquad \text{...(A 17)}$$

where $B(1+\alpha,1+\beta)$ is the Beta function $\int_0^1 x^{\alpha}(1-x)^{\beta}dx$, and can be quite easily computed from a programmable calculator using Simpson's approximation procedure for evaluating a definite integral. One can obtain a similar

computing expression for G^P , given by

$$G^P = 2\tilde{a}(\sqrt{2})^{\tilde{\alpha}+\tilde{\beta}+1}.B(1+\tilde{\alpha},1+\tilde{\beta}) \quad \text{...(A 18)}$$

where $\tilde{a}$, $\tilde{\alpha}$, $\tilde{\beta}$ are the OLS parameter estimates corresponding to the distribution of income among the poor.

This brings us, next, to the estimation of the head count ratio (HCR). Notice, first, that from (A 10) one has:

$$g'(\pi) = a\pi^{\alpha}(\sqrt{2}-\pi)^{\beta}((\alpha/\pi)-(\beta/(\sqrt{2}-\pi))). \quad \text{...(A 19)}$$

Also,

$$g'(\pi) = \frac{\dfrac{d(\frac{1}{\sqrt{2}}(F-F_1))}{dy}}{\dfrac{d(\frac{1}{\sqrt{2}}(F+F_1))}{dy}}$$

$$= (f(y)-\frac{yf(y)}{\mu}) / (f(y)+\frac{yf(y)}{\mu})$$

$$= \frac{\mu-y}{\mu+y}. \quad \text{...(A 20)}$$

From (A 19) and (A 20), one has:

$$a\pi^{\alpha}(\sqrt{2}-\pi)^{\beta}(\frac{\alpha}{\pi}-\frac{\beta}{\sqrt{2}-\pi}) = \frac{\mu-y}{\mu+y}. \quad \text{...(A 21)}$$

For $y=y^*$, let (A 21) be solved by $\pi = \pi^*$; plugging π^* back into (A 10), one obtains η^* -- the value attained by η when y attains the poverty line value of y^*. Now that π^* and η^* are kmown, it is a simple matter, given (A4) and (A 12), to obtain an estimate of the head count ratio which

is given by:

$$HCR = \frac{1}{\sqrt{2}}(\pi^* + \eta^*). \qquad ...(A\ 22)$$

From (A 6), the Proprtionate Income Gap (PIG) is easily obtained as:

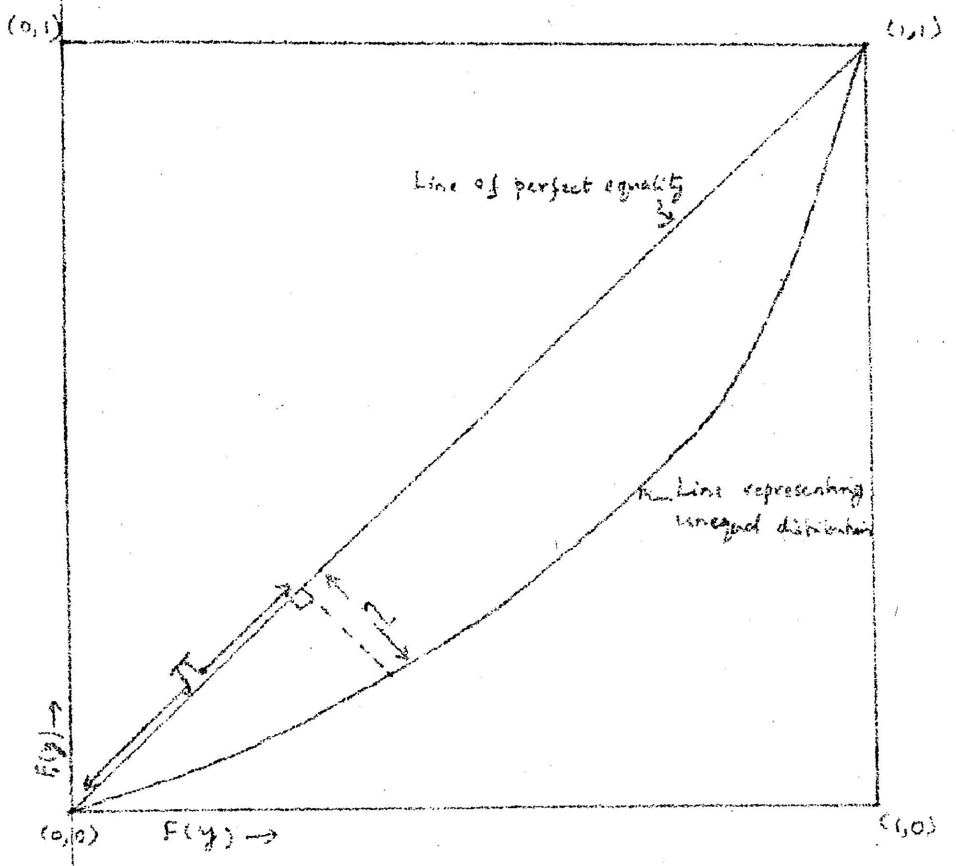
$$PIG = 1 - ((\pi^* - \eta^*)/(\pi^* + \eta^*))(\mu/y^*). \qquad ...(A\ 23)$$

In similar fashion, the Sen index of poverty can be routinely computed by making the appropriate substitutions from (A 22), (A 23) and (A 17) for the HCR, PIG and G^P respectively in the right hand side of the expression for S:

$$S = HCR(PIG+(1-PIG)G^P).$$

The key to the entire computational procedure, then, is the estimation of the parameters a, α and β; once these parameters have been estimated, all that is left is the fairly routine job of scanning the equations above for the relevant computing formulae to obtain estimates of the inequality/poverty indices that we are interested in.

Figure A1: The Lorenz Curve



NOTES:

1. For excellent descriptions, see Appendix C in Sen (1981), Sen (1974) and Kakwani (1980a).

2. Owing to data constraints, the poverty line we shall use will be in terms of Consumer Expenditure rather than income: the National Sample Survey (NSS for short) provides data only on the distribution of consumer expenditure and not of income. We shall have more to say on the nature of the NSS data presently, but for the moment what is relevant is to note that the poverty line can be specified in terms of any variable - income, or expenditure, or amount of land or other income-earning assets owned -- that we may consider appropriate to our context.

3. For illuminating discussions on the subject see, among others, Sen (1983) and Townsend (1979).

4. Cited in Sen (1983), p.16.

5. Sen (1983), p.156.

6. For a detailed, axiomatic derivation of S, see Sen (1976).

7. The interested reader is referred to Kakwani (1980b).

8. In particular, we shall not be using any of the socalled "ethical" measures of inequality; on the latter, see, among others, Dalton (1920), Atkinson (1970), and Sen (1978).

9. For a discussion of this problem (and other controversies), see the exchanges between Minhas and Bardhan (Minhas (1971a,b,c) and Bardhan (1970; 1971a,b)).

10. See, again, the exchanges between Minhas and Bardhan, cited in fn.9.

11. In his study, Ahluwalia (1978) converts the poverty lines at constant prices into State-specific poverty lines, to take account of State-specific price levels - which betray variations from the (aggregate) all-India price levels. Our estimates of rural poverty will, for this reason, differ from Ahluwalia's.

12. For estimates of rural poverty in Tamil Nadu based on a different price index (the Index of Rural Prices), see Kurien (1977).

13. The Journal furnishes the CPIIW for four centres in Tamil Nadu; Coimbatore, Coonoor, Madras and Madurai; for our purposes, we have taken a simple average of the four values in each year to construct the CPIIW series.

14. For an interpretation and critique, revolving around this issue, of Ahluwalia's (1978) study of rural poverty in India, see Saith (1981). See also Vaidyanathan (1974).

15. The precise data sources for the different years are cited below:

<u>1961/62</u>: NSS 17th Round; September 1961-July 1962; Number 134; <u>Tables with Notes on Consumer Expenditure</u>.

<u>1963/64</u>: NSS 18th Round; February 1963-January 1964; Number 142; <u>Tables with Notes on Consumer Expenditure</u> (Preliminary)

<u>1965/66</u>: NSS 20th Round; July 1965-June 1966; Number 209; <u>Tables with Notes on Consumer Expenditure</u>.

<u>1967/68</u>: NSS 22nd Round; July 1967-June 1968; Number 216; <u>Tables with Notes on Consumer Expenditure</u>.

<u>1968/69</u>: NSS 23rd Round; July 1967-June 1968; Number 228; <u>Tables with Notes on Consumer Expenditure</u>.

<u>1969/70</u>: NSS 24th Round; July 1969-June 1970; Number 235; <u>Tables with Notes on Consumer Expenditure</u>.

<u>1970/71</u>: NSS 25th Round; July 1970-June 1971; Number 231; <u>Tables with Notes on Consumer Expenditure</u>.

<u>1972/73</u>: <u>Survey Results</u> tabulated in Sarvekshana, Vol.II, No.3, January 1979: <u>Consumer Expenditure</u>, NSS 27th Round (October 1972-September 1973).

<u>1973/74</u>: NSS 28th Round; October 1973-June 1974; Number 240; <u>Tables with Notes on Consumer Expenditure</u>.

<u>1977/78</u>: NSS 32nd Round; July 1977-June 1978: Number 311; <u>Report in the Second Quinquennial Survey on Consumer Expenditure</u>.

<u>1983</u>: NSS 38th Round; January-December 1983; Number 319; <u>Report on the Third Quinquennial Survey on Consumer Expenditure</u> (Draft).

16. <u>Survey Results</u> tabulated in <u>Sarvekshana</u>, Vol.VI, Nos.3-4, January April, 1983; <u>Per Capita Per Diem Intake of Nutrients</u>, NSS 27th Round, (October 1972-September 1973).

17. Cited in Vaidyanathan (1983, p.4).

18. Vaidyanathan (1983, p.16).

19. From the decadal census population data one can obtain the annual compound rate of growth of population, on the basis of which population figures for the inter-censal years can be interpolated, and for the year 1983, extrapolated; using these estimates of rural and urban population, and applying the rural and urban HCRs estimated from the NSS consumer expenditure data to these population estimates, one can obtain a series on the (weighted average) HCRs for Tamil Nadu as a whole over the reference period under consideration.

20. Details of the estimated Linear regressions of population in absolute poverty on time are presented below:

	Intercept coefficient	Slope coefficient	Computed t-statistic for slope coefficient	Statistical significance of slope coefficient at 10% L.O.S.
Rural	13.19×10^6	.0210	.279	Not significant
Urban	4.89×10^6	.1400	3.921	Significant
State	18.07×10^6	.1610	1.832	Significant

21. Details of the estimated linear regressions of population in "flexibly" absolute poverty on time are presented below:

	Intercept coefficient	Slope coefficient	Computed t-statistic for slope coefficient	Statistical significance of slope coefficient at 10% L.O.S.
Rural	12.99×10^6	.3109	4.399	Significant
Urban	4.65×10^6	.2837	8.967	Significant
State	17.65×10^6	.5945	8.107	Significant

22. Output figures are available in the annual State Government publication Season and Crop Report of Tamil Nadu. At the time of writing this Chapter, data for the year 1983-84 are not available.

23. The computed value of the t-statistic is high, at 7.30.

24. On related issues, see Sukhatme (1977).

25. See fn.16.

26. Estimate of per capita state income is from *Tamil Nadu: An Economic Appraisal*, 1980 (Government of Tamil Nadu).

27. Kurien (1977) provides some estimates of poverty among agricultural labour and owner-cultivator households in his study of rural poverty in Tamil Nadu; his general conclusions are supported by the 1977/78 NSS data we have used.

28. In Sections III.1 and III.3, the G ratios have been computed by the usual "trapezoidal approximation" method.

29. For a detailed analysis of changes in concentration, size-class by size-class, see Kurien (1981).

30. One other source of data on the distribution of operational holdings is the World Agricultural Census (or WAC), 1970/71, which, as its name suggests, presents information not from sampling but by complete enumeration. The Gini ratio computed from the WAC data for 1970/71 is .563 -- considerably lower than the Gini ratio computed from the NSS data. There is reason to believe that there is a considerable under-reporting of land operated in the WAC. For a comprehensive critique of the sources of official data on land-holdings in Tamil Nadu, see Ramachandran (1980).

31. Care should be taken to note that the ordering is in terms of a clearly specified index of welfare ($\mu(1-G)$), and should not be interpreted as representing a ranking according to any other criterion of development.

Table 1 (a): Consumer Price Index of Agricultural Labourers (1960 = 100)

Year	Index Number of Prices
1961/62	113
1963/64	121
1965/66	143
1967/68	172
1968/69	177
1969/70	190
1970/71	174
1972/73	192
1973/74	242
1977/78	306
1983/84	528

Table 1 (b): Consumer Price Index of Industrial Workers (1960=100)

Year	Index Number of Prices
1961/62	106.75
1963/64	119.00
1965/66	140.50
1967/68	155.25
1968/69	160.50
1969/70	171.25
1970/71	181.75
1972/73	214.75
1973/74	294.00
1977/78	323.75
1983/84	563.25

Table 2 (a): Poverty Lines (in Rupees) at Current Prices: Rural Tamil Nadu

Year	"Absolute" Poverty Line	"Abject" Poverty Line	"Flexibly Absolute" Poverty Line	"Relative" Poverty Line
1961/62	16.95	8.48	17.12	21.73
1963/64	18.15	9.08	18.70	23.29
1965/66	21.45	10.73	22.54	24.57
1967/68	25.80	12.90	27.66	29.61
1968/69	26.55	13.28	28.75	30.02
1969/70	28.50	14.25	31.17	32.08
1970/71	26.90	13.05	28.83	29.98
1972/73	28.80	14.40	32.45	36.41
1973/74	36.30	19.85	41.31	47.44
1977/78	45.90	22.95	57.70	63.33
1983/84	79.20	39.60	99.57	112.23

Table 2 (b): Poverty Lines (in Rupees) at Current Prices: Urban Tamil Nadu

Year	"Absolute" Poverty Line	"Abject" Poverty Line	"Flexibly Absolute" Poverty Line	"Relative" Poverty Line
1961/62	21.35	10.68	21.56	29.74
1963/64	23.80	11.90	24.52	31.47
1965/66	28.10	14.05	29.53	34.11
1967/68	31.05	15.53	33.29	41.22
1968/69	32.10	16.05	34.76	40.68
1969/70	34.25	17.13	37.46	43.70
1970/71	36.35	18.18	40.15	44.69
1972/73	42.95	21.48	48.40	49.68
1973/74	58.80	29.40	66.92	64.78
1977/78	64.75	32.38	81.40	86.14
1983/84	112.65	56.33	141.62	163.74

Table 3 (a): Average Per Capita Consumer Expenditure Levels (in rupees) in Rural and Urban Areas of Tamil Nadu

Year	Average Real Per Capita Expenditure (Rural)	Average Real Per Capita Expenditure (Urban)
1961/62	19.23	27.86
1963/64	19.25	26.45
1965/66	17.18	24.28
1967/68	17.22	26.55
1968/69	16.96	25.35
1969/70	16.88	25.52
1970/71	17.23	24.59
1972/73	18.96	23.13
1973/74	19.60	22.03
1977/78	20.70	26.61
1983/84	21.26	29.07

Table 3 (b): Median Per Capita Consumer Expenditure Levels (in rupees) in Rural and Urban areas of Tamil Nadu

Year	Median Real Per Capita Expenditure (Rural)	Median Real Per Capita Expenditure (Urban)
1961/62	16.17	21.78
1963/64	15.98	20.49
1965/66	14.39	19.12
1967/68	14.85	19.89
1968/69	14.10	20.21
1969/70	13.94	20.14
1970/71	15.07	19.06
1972/73	16.33	18.65
1973/74	16.90	17.82
1977/78	16.91	21.10
1983/84	17.18	22.52

Table 4 (a): Average Real Per Capita Consumer Expenditure Levels (in rupees) of the Poor and Non-poor in Rural Tamil Nadu

Year	Average Real Per Capita Expenditure of the Poor	Average Real Per Capita Expenditure of the Non-poor
1961/62	10.51	26.17
1963/64	10.86	26.16
1965/66	10.59	24.72
1967/68	10.81	23.95
1968/69	10.08	25.07
1969/70	10.37	25.06
1970/71	10.98	23.40
1972/73	11.13	24.93
1973/74	11.02	25.73
1977/78	11.04	27.19
1983/84	10.93	28.12

Table 4 (b): Average Real Per Capita Consumer Expenditure Levels (in rupees) of the Poor and Non-poor in Urban Tamil Nadu

Year	Average Real Per Capita Expenditure of the Poor	Average Real Per Capita Expenditure of the Non-poor
1961/62	14.59	38.05
1963/64	14.50	37.57
1965/66	13.54	36.30
1967/68	14.11	39.18
1968/69	13.90	36.48
1969/70	14.04	36.72
1970/71	13.85	36.88
1972/73	13.83	34.52
1973/74	13.77	33.73
1977/78	14.20	37.24
1983/84	14.38	39.49

Table 5: Trends in the Proportionate Expenditure Gap in Rural and Urban Tamil Nadu

Year	Proportionate Expenditure Gap (per cent)	
	Rural	Urban
1961/62	29.91	27.03
1963/64	27.60	27.48
1965/66	29.37	32.28
1967/68	27.95	29.47
1968/69	32.81	30.50
1969/70	30.88	29.78
1970/71	26.82	30.73
1972/73	25.80	30.83
1973/74	26.53	31.17
1977/78	26.40	28.98
1983/84	27.13	28.11

Table 6: Trends in the Gini Ratio of Inequality in Consumer Expenditure of the Poor in Rural and Urban Tamil Nadu

Year	Gini Ratio of Inequality	
	Rural	Urban
1961/62	.1539	.1311
1963/64	.1329	.1277
1965/66	.1352	.1472
1967/68	.1301	.1416
1968/69	.1539	.1438
1969/70	.1442	.1423
1970/71	.1271	.1400
1972/73	.1203	.1392
1973/74	.1167	.1370
1977/78	.1357	.1394
1983/84	.1347	.1387

Table 7 (a): Trends in the Head-Count Ratio, Using Different Poverty Lines, in Rural Tamil Nadu

Year	Head Count Ratio (per cent) Corresponding to			
	"Absolute" Poverty line	"Abject" Poverty line	"Flexibly Absolute" Poverty line	"Relative" Poverty line
1961/62	44.34	6.99	45.25	62.84
1963/64	45.20	4.84	47.57	64.40
1965/66	53.37	6.69	56.87	62.95
1967/68	51.26	5.42	56.45	58.80
1968/69	54.11	10.19	59.45	62.31
1969/70	55.64	8.62	62.04	63.96
1970/71	49.67	4.68	57.91	61.22
1972/73	43.22	3.34	52.76	61.49
1973/74	41.64	5.15	50.71	59.92
1977/78	40.21	4.36	58.73	65.68
1983	39.94	4.42	56.70	64.91

Table 7 (b) Trends in the Head-Count Ratio, Using Different Poverty Lines, in Urban Tamil Nadu

Year	Head-Count Ratio (per cent) Corresponding to			
	"Absolute" Poverty line	"Abject" Poverty line	"Flexibly Absolute" Poverty line	"Relative" Poverty line
1961/62	43.44	4.39	44.05	67.48
1963/64	48.23	4.62	50.50	68.77
1965/66	52.83	8.93	56.12	65.01
1967/68	50.37	7.35	55.66	70.20
1968/69	49.32	7.47	54.76	64.93
1969/70	49.32	6.77	55.92	66.17
1970/71	53.37	7.88	60.22	69.52
1972/73	55.05	8.14	63.15	64.84
1973/74	58.58	8.49	69.62	65.00
1977/78	46.15	5.96	62.15	65.80
1983	41.49	5.06	57.69	67.06

Table 7 (c): Trends in the Head-Count Ratio, Using Different Poverty Lines, in Tamil Nadu State.

Year	Head-Count Ratio (per cent) corresponding to			
	"Absolute" Poverty line	"Abject" Poverty line	"Flexibly Absolute" Poverty line	"Relative" Poverty line*
1961/62	44.10	6.29	44.92	64.13 (21.56)
1963/64	46.00	4.78	48.35	65.57 (21.25)
1965/66	53.18	7.30	56.62	63.49 (19.20)
1967/68	50.95	5.98	56.24	62.15 (19.95)
1968/69	52.67	9.38	58.04	63.05 (19.44)
1969/70	53.75	8.03	60.17	64.58 (19.47)
1970/71	50.79	5.63	58.61	63.73 (19.46)
1972/73	46.87	4.82	55.95	62.51 (20.24)
1973/74	46.90	6.18	56.57	64.43 (20.35)
1977/78	42.12	4.87	59.83	65.72 (22.60)
1983	40.46	4.63	57.03	65.63 (23.88)

*Figures in brackets relate to average per capita consumer expenditure at 1960/61 prices.

Table 8: Number of People in Poverty (in millions) in Tamil Nadu

Year	Number in "Absolute" Poverty			Number in "Abject" Poverty			Number in "Flexibly Absolute" Poverty			Number in "Relative" Poverty		
	Rural	Urban	State	Rural	Urban	State	Rural	Urban	State	Rural	Urban	State
1961/62	11.12	4.04	15.16	1.75	.41	2.16	11.35	4.09	15.44	15.77	6.27	22.04
1963/64	11.68	4.78	16.46	1.25	.46	1.71	12.29	5.01	17.30	16.64	6.82	23.46
1965/66	14.22	5.59	19.81	1.78	.94	2.72	15.15	5.94	21.09	16.77	6.88	23.65
1967/68	14.07	5.69	19.76	1.49	.83	2.32	15.50	6.31	21.81	16.14	7.96	24.10
1968/69	15.08	5.76	20.84	2.84	.87	3.71	16.57	6.39	22.96	17.37	7.58	24.95
1969/70	15.74	5.96	21.70	2.44	.82	3.26	17.55	6.74	24.29	18.09	7.98	26.07
1970/71	14.27	6.65	20.92	1.34	.98	2.32	16.64	7.50	24.14	17.59	8.66	26.25
1972/73	12.72	7.21	19.93	0.98	1.07	2.05	15.52	8.27	23.79	18.09	8.49	26.58
1973/74	12.40	7.86	20.26	1.53	1.14	2.67	15.10	9.34	24.44	17.84	8.72	26.56
1977/78	12.56	6.83	19.39	1.36	.88	2.24	18.34	9.20	27.54	20.51	9.74	30.25
1983	13.24	6.94	20.18	1.47	.85	2.32	18.80	9.65	28.45	21.25	11.22	32.74

Table 9: Trends in the Sen Index of Poverty

Year	Sen Index of Poverty	
	Rural	Urban
1961/62	.1804	.1590
1963/64	.1624	.1772
1965/66	.2077	.2232
1967/68	.1913	.1988
1968/69	.2335	.1997
1969/70	.2273	.1965
1970/71	.1794	.2158
1972/73	.1474	.2227
1973/74	.1462	.2378
1977/78	.1463	.1794
1983	.1476	.1580

Table 10: Summary Picture of Nutritional Poverty and Nutritional Inequality in Tamil Nadu (1972/73)

S.No.	Index of Nutritional Poverty/Inequality	Value of Index Rural	Urban
1.	Average per capita per diem intake of kilocalories	1985	1841
2.	Average per capita per diem intake of kilocalories among the "nutritionally poor"	1749	1694
3.	Head Count Ratio (i.e. per cent of people below an absolute poverty line of 2400 kilocalories/person / day)	77.66	89.49
4.	Proportionate calorie-intake gap (%) of the poor	27.13	29.42
5.	Gini ratio of inequality in the distribution of calorific consumption among the "nutrtionally poor"	.119	.112
6.	Sen Index of (nutritional) poverty	.278	.334
7.	Proportion of people in drastic malnutrition (i.e with consumption levels of less than 1200 kilocals/person/day)	5.48	5.42
8.	Gini ratio of inequality in the distribution of calorific consumption among the entire population	.149	.156

Table 11: Occupational Profile of Poverty in Tamil Nadu (1977/78)

Sl. No.	Principal Industry	Percentage of Households in Poverty* Rural	Urban
1.	Agriculture		
	-Self-employed in agricultural operations	26.29(22.43)	
	-Agricultural labour	49.99(54.81)	
	-Total (Agriculture)	39.39(77.24)	54.61(15.77)
2.	Mining and Quarrying	24.14(0.35)	12.43(0.19)
3.	Manufacturing	29.29(8.13)	39.38(27.89)
4.	Electricity, Gas and Water	6.46(0.74)	16.74(0.66)
5.	Construction	32.67(1.73)	53.98(5.90)
6.	Trade	25.87(3.68)	39.63(17.89)
7.	Transport	22.16(0.79)	40.58(7.79)
8.	Services	26.44(5.02)	30.40(17.20)
9.	Others	27.47(2.97)	40.75(6.71)

* Figures in brackets indicate the proportionate constribution of each industry to the total number of households in poverty.

Note: Table 11 has been prepared from data available in Table 1.7(Rural) and Tables 2.7(Rural) and 2.7(Urban) of the Survey Results published in Sarvekshana, Vol.VI, Nos-1-2, July-October 1982.

Table 12: Percentage Distribution of Rural Households According to Value of Assets and Share of Each Asset in the Total Value of Assets in Tamil Nadu: 1961/62 and 1971/72.

Asset Groups	All Rural Households' Percentage Share in Households		Assets	
	1961/62	1971/72	1961/62	1971/72
Less than Rs.500/-	29.5	25.54	1.2	.86
500-1000	11.8	12.59	1.6	1.30
1000-2500	17.8	16.01	5.6	3.89
2500-5000	15.0	13.59	10.4	7.22
5000-10,000	13.1	13.72	17.7	14.40
10,000-20,000	7.5	10.40	20.2	11.86
20,000 and above	5.3	8.15	43.3	60.47
All Asset Groups	100.00	100.00	100.00	100.00

Table 13: Distribution of Ownership and Operational Land Holdings by Size Class of Household Holdings in Tamil Nadu, (1959/60 & 1971/72.)

Size-class of ownership/ Operational Holdings (acres)	Distribution of Ownership Holdings						Distribution of Operational Holdings					
	Average area owned (acres)		Percentage of				Average area operated (acres)		Percentage of			
			Households		Area Owned				Households		Area Operated	
	1959-60	1971-72	1959-60	1971-72	1959-60	1971-72	1959-60	1971-72	1959-60	1971-72	1959-60	1971-72
Upto 0.99	.12	.13	60.42	60.53	3.43	4.45	0.12	0.13	56.43	56.04	3.19	3.77
1-2.49	1.64	1.61	17.09	17.87	13.76	15.78	1.67	1.67	17.58	20.68	13.63	18.17
2.5-4.99	3.54	3.48	11.33	11.39	19.73	21.84	3.60	3.49	13.72	12.45	23.00	22.95
5-7.49	6.04	6.08	4.54	4.76	13.50	15.95	6.05	6.09	5.34	5.46	15.03	17.52
7.5-9.99	8.52	8.48	2.56	1.99	10.73	9.26	8.49	8.53	2.97	2.21	11.73	9.92
10-14.99	12.00	11.80	1.88	2.01	11.09	12.99	11.86	11.91	3.25	1.75	12.43	10.96
15-19.99	16.39	17.14	1.20	0.72	9.64	6.73	16.91	17.12	0.79	0.75	6.18	6.76
20-24.99	22.32	21.60	0.34	0.27	3.56	3.23	21.25	21.77	0.34	0.32	3.38	3.70
25-29.99	27.50	26.42	0.20	0.15	2.71	2.24	25.83	26.77	0.21	0.15	2.48	2.03
30-49.99	36.53	37.26	0.27	0.22	5.21	4.46	36.88	36.67	0.17	0.16	4.69	3.15
50 & above	78.40	59.08	0.17	0.99	6.58	3.05	89.67	72.68	0.10	0.03	4.27	1.11
All size classes	2.03	1.83	100.00	100.00	100.00	100.00	2.15	1.90	100.00	100.00	100.00	100.00

Table 14: Trends in the Gini Ratio of Inequality in the Distribution of Consumer Expenditure in Rural and Urban Tamil Nadu

Year	Gini Ratio	
	Rural	Urban
1961/62	.3135	.3443
1963/64	.3068	.3438
1965/66	.2930	.3386
1967/68	.2849	.3729
1968/69	.3102	.3343
1969/70	.3069	.3399
1970/71	.2636	.3444
1972/73	.2764	.3170
1973/74	.2781	.3089
1977/78	.3210	.3384
1983	.3287	.3563

Table 15: Values of $\mu(1-G)$ of Rural Consumption of Each State (Column) at Prices of Every State (Row) (1973/74)

State	Andhra Pradesh	Assam	Bihar	Gujarat	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Orissa	Punjab Haryana	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
Andhra Pradesh	35.47	38.57	39.01	38.20	37.43	36.24	39.33	36.46	31.92	51.21	47.92	32.48	41.15	28.48
Assam	37.31	40.58	41.03	40.18	39.36	38.11	41.36	38.34	33.57	53.85	50.39	34.16	43.27	29.94
Bihar	36.16	39.33	39.77	38.95	38.15	36.94	40.10	37.16	32.54	52.20	48.85	33.11	41.94	29.02
Gujarat	38.44	41.83	42.29	41.41	40.57	39.28	42.63	39.51	34.60	55.50	51.94	35.21	44.59	30.86
Karnataka	35.70	38.84	39.26	38.45	37.67	36.47	39.57	36.69	32.13	51.54	48.23	32.69	41.41	28.66
Kerala	36.84	40.08	40.53	39.68	38.88	37.64	40.85	37.87	33.15	53.19	49.78	33.74	42.74	29.58
Madhya Pradesh	32.27	35.10	35.49	34.76	34.05	32.97	35.78	33.16	29.04	46.58	43.60	29.55	37.43	25.90
Maharashtra	36.61	39.83	40.28	39.44	38.63	37.41	40.60	37.63	32.95	52.86	49.47	33.53	42.47	29.39
Orissa	33.18	36.10	35.49	35.74	35.01	34.24	36.80	34.10	29.86	47.90	44.83	30.39	38.49	26.64
Punjab& Haryana	36.39	38.59	40.02	39.19	38.39	37.17	40.35	37.40	32.74	52.53	49.16	33.32	42.21	29.21
Rajasthan	33.64	36.60	37.00	36.23	35.50	34.37	37.30	34.57	30.27	48.56	45.45	30.81	39.02	27.01
Tamil Nadu	37.53	40.83	41.28	40.42	39.60	38.34	41.62	38.57	33.77	54.18	50.70	34.37	43.53	30.13
Uttar Pradesh	33.18	36.10	36.48	35.74	35.01	33.90	36.80	34.10	29.86	47.90	44.83	30.39	38.49	26.64
West Bengal	39.61	45.06	45.56	44.62	43.71	42.31	45.93	42.57	37.27	59.80	55.96	37.93	48.05	33.25

Figure 1: The Lorenz Curve

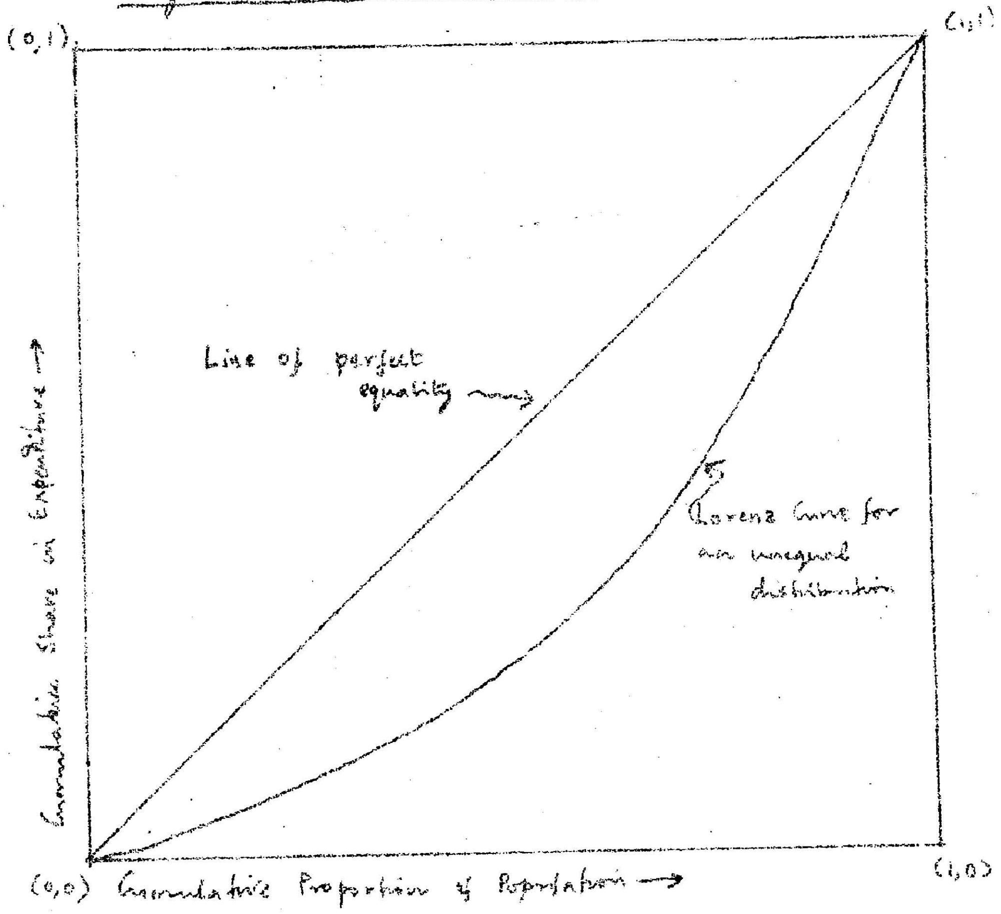


Figure 2(a)

Average Real Per Capita Consumer Expenditure.

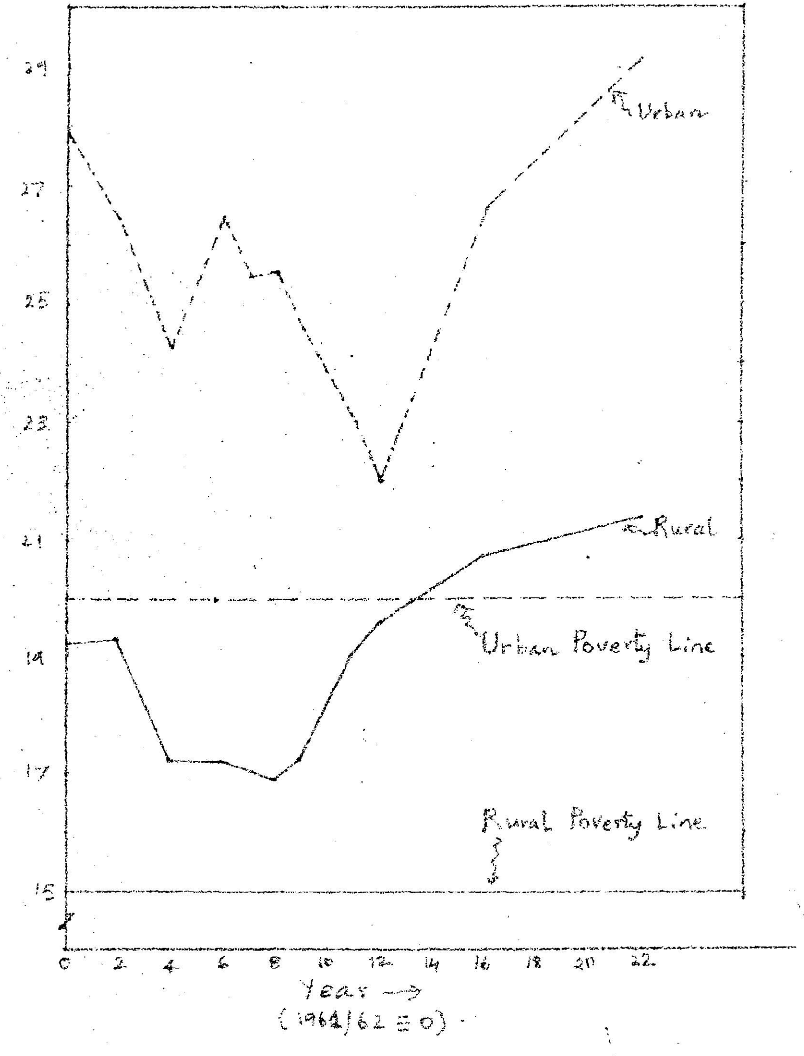


Figure 2(b)
Median Real Per Capita Consumer Expenditure

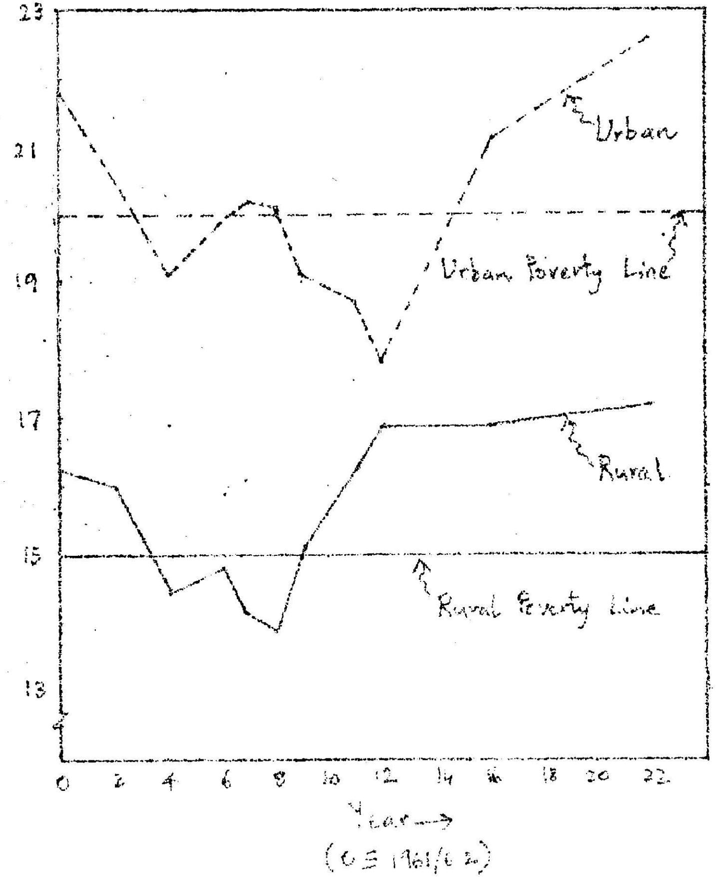


Figure 3(a): Average Real Per Capita Consumer Expenditure of the Poor in Rural and Urban Areas.

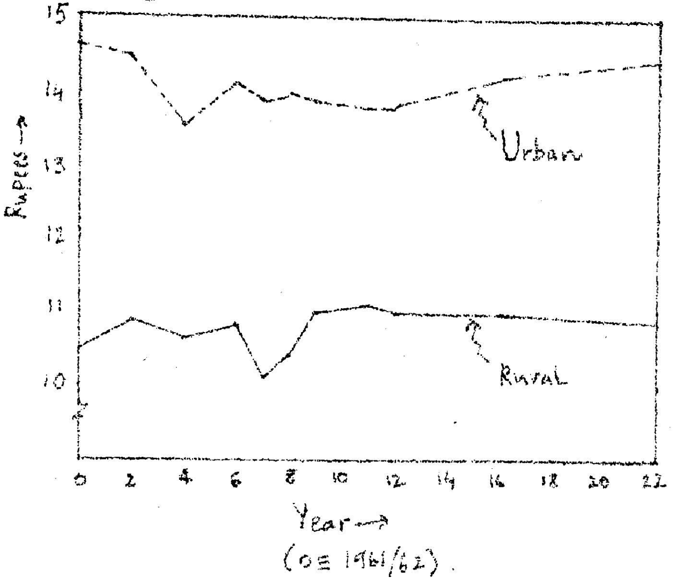


Figure 3(b): Average Real Per Capita Consumer Expenditure of the Nonpoor in Rural and Urban Areas.

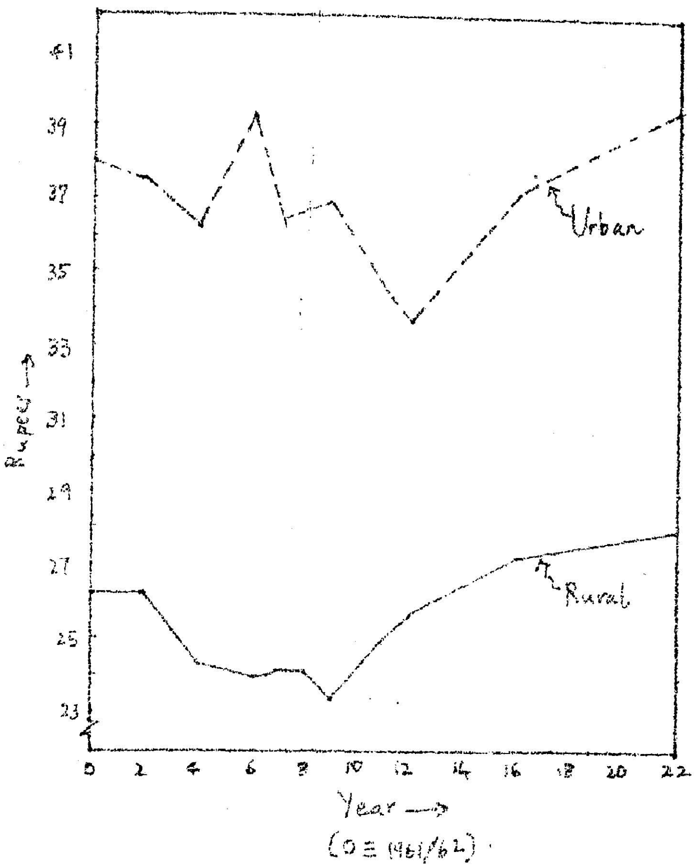


Figure 4: Proportionate Expenditure Gap (Per Cent).

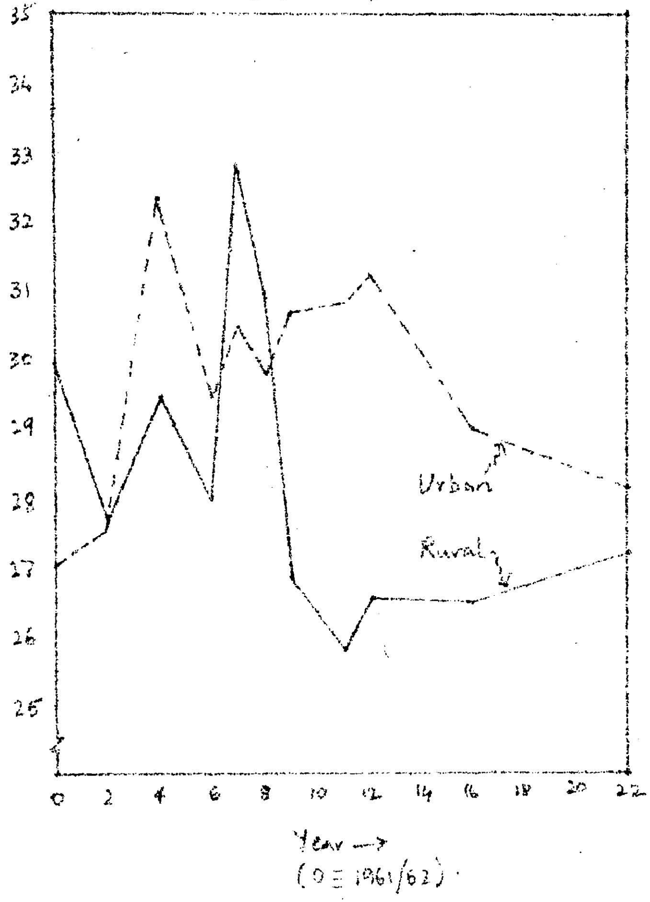


Figure 5: Gini Ratio of Inequality in Distribution of Consumer Expenditure Among the Poor.

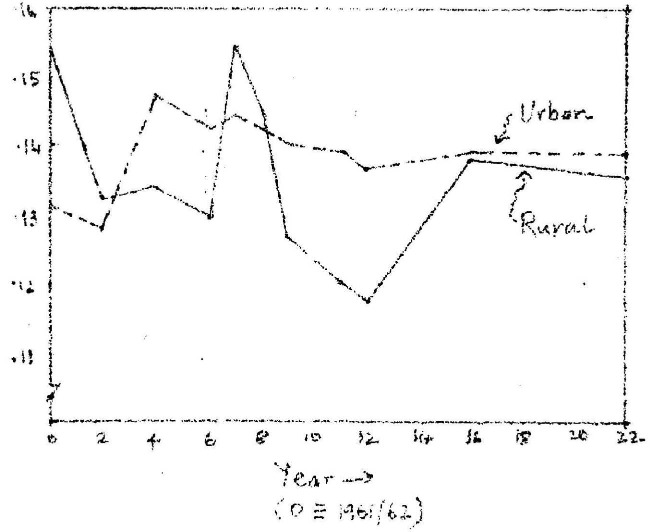


Figure 6(a): Head-Count Ratio (per cent): Rural and Urban.

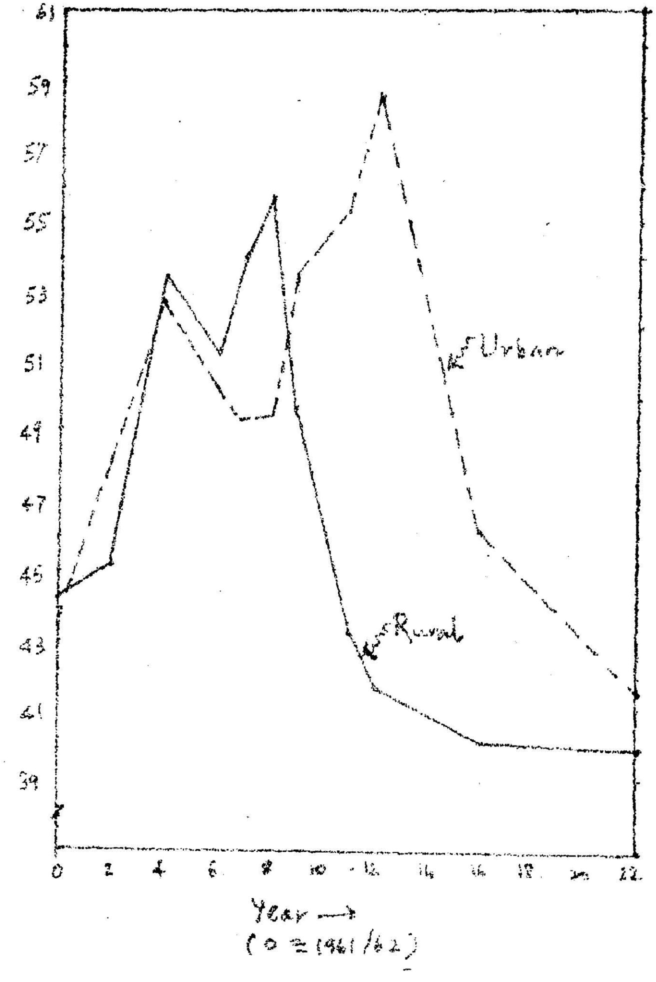


Figure 6(b): Head-Count Ratio (per cent): State.

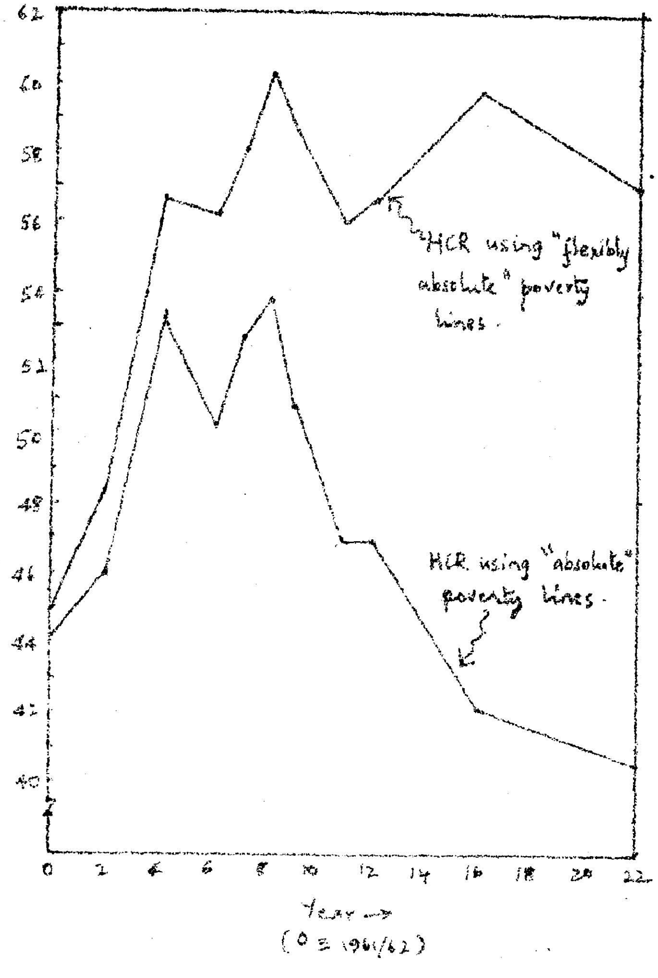


Figure 7: Partial Ordering of Reference Years According to "Relative" Poverty.

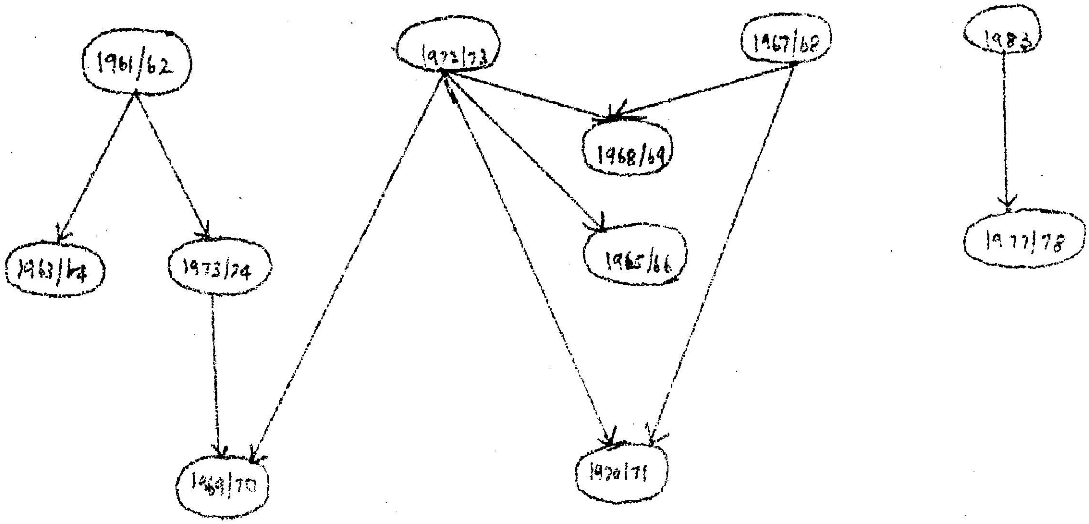


Figure 8(b): Numbers of people (in millions) in poverty:— State

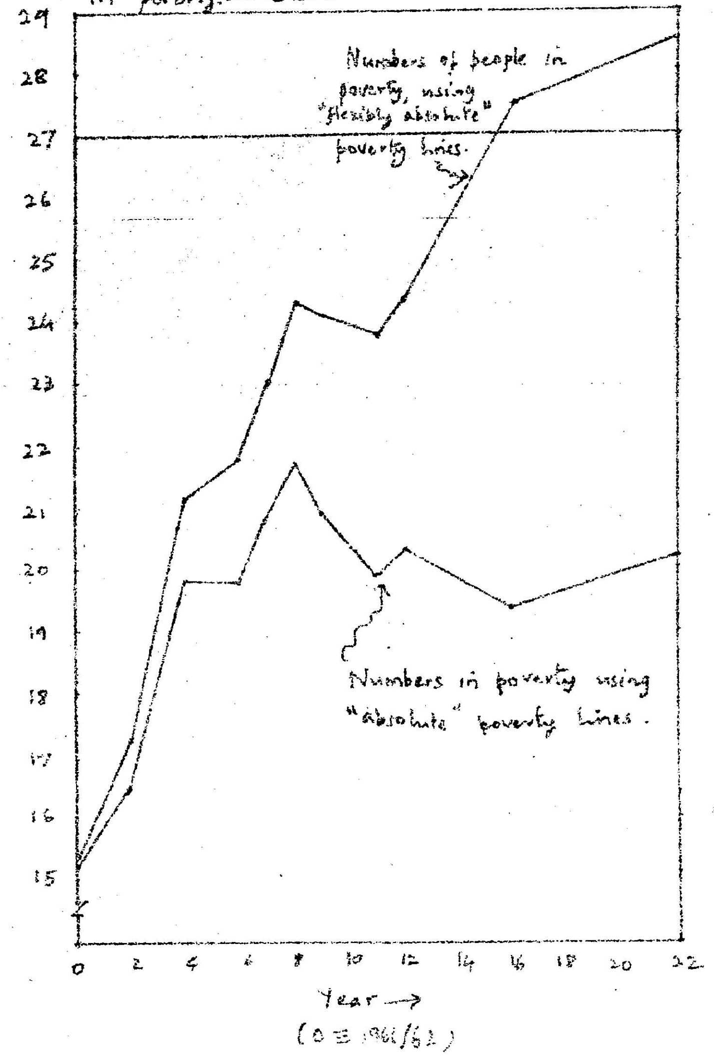


Figure 8(a): Numbers of people (in millions) in poverty: Rural and Urban

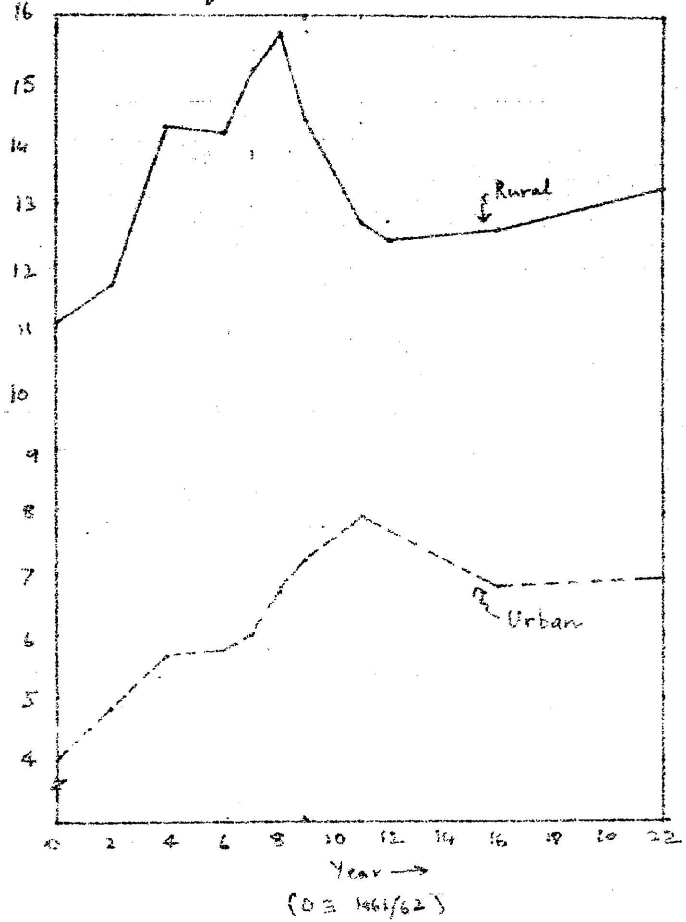


Figure 9: Sen Index of Poverty.

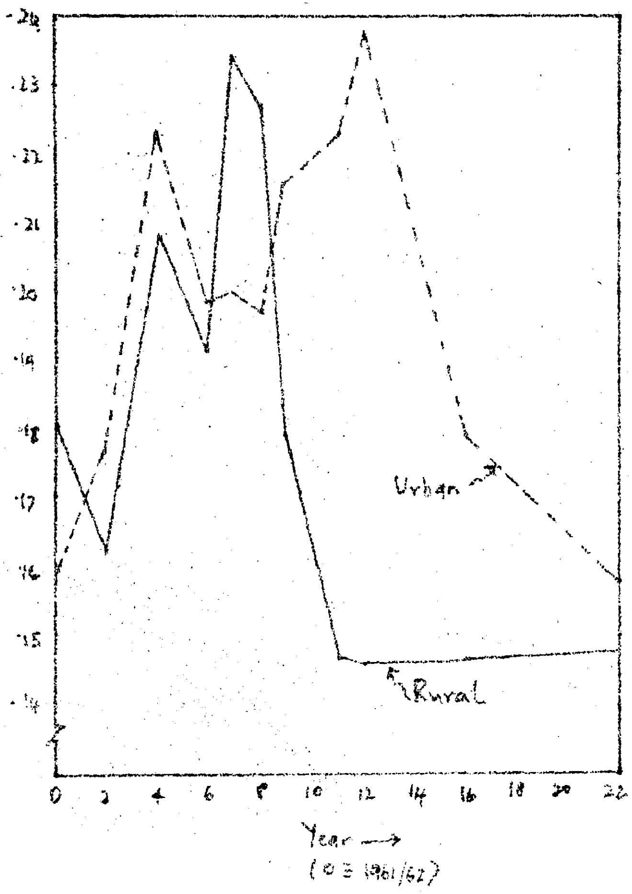


Figure 10: Movements in the "Implicit Urban-Rural Exchange Rates" and the Ratio of the Urban-to-Rural Sen Index of Poverty.

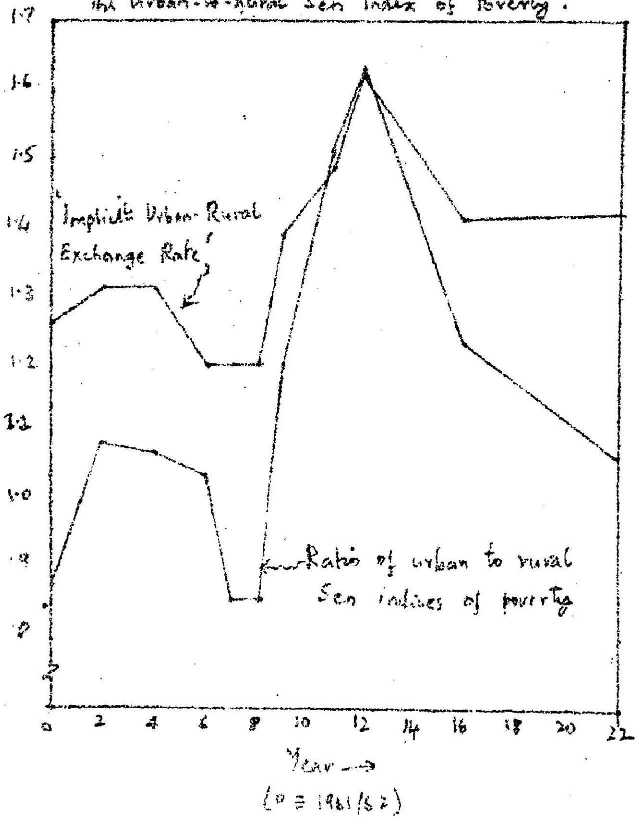
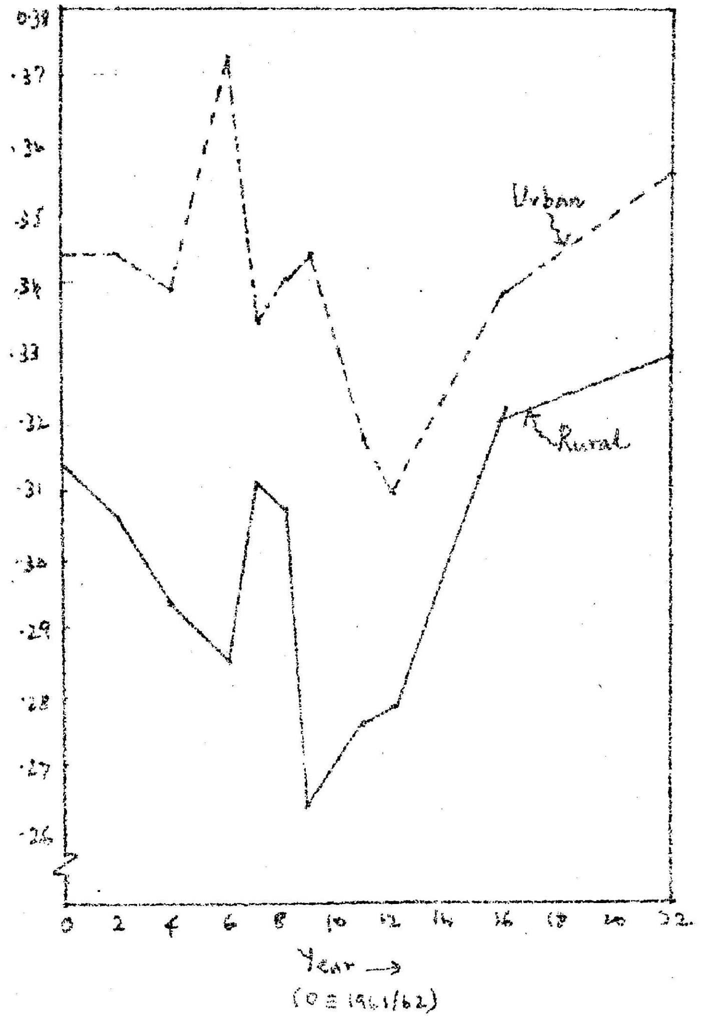


Figure 11: Gini Index of Inequality in Distribution of Consumer Expenditure among the entire Population



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